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Opportunities for Increasing Markets and Employment in the Shoe Industry

Volume 2

U.S. DEPARTMENT OF COMMERCE
Economic Development Administration

This technical assistance study was accomplished by professional consultants under contract with the Economic Development Administration. The statements, findings, conclusions, recommendations, and other data in this report are solely those of the contractor and do not necessarily reflect the views of the Economic Development Administration.

Volume Two Contains:

"OPPORTUNITIES FOR INCREASED PROFITS THROUGH INVENTORY MANAGEMENT IN THE SHOE INDUSTRY" by G. L. Robinson

"RESEARCH AND DEVELOPMENT IN THE UNITED STATES SHOE INDUSTRY" by Robert L. Crosby

"OPPORTUNITIES FOR INCREASING EXPORTS" by J. R. Miller

Summary and Final Report

on

Opportunities for Increasing Markets and Employment in the Shoe Industry (Nonrubber)

In Two Volumes

Volume 2

prepared by

Battelle Memorial Institute

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for the

U.S. DEPARTMENT OF COMMERCE
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and Director of Economic Development

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II

OPPORTUNITIES FOR INCREASED PROFITS THROUGH INVENTORY MANAGEMENT IN THE SHOE INDUSTRY

by

G. L. Robinson

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*Appendix C and portions of Appendix A prepared by Dr. Walter C. Giffin, Assistant Professor of Industrial Engineering, The Ohio State University, and Consultant to Battelle Memorial Institute.

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*Appendix D prepared by Dr. Walter C. Giffin, Assistant Professor of Industrial Engineering, The Ohio State University, and Consultant to Battelle Memorial Institute.

OPPORTUNITIES FOR INCREASED PROFITS THROUGH INVENTORY MANAGEMENT IN THE SHOE INDUSTRY

by

G. L. Robinson

EXECUTIVE SUMMARY

The United States shoe-manufacturing industry has a high inventory investment in comparison to profits — so high that the annual costs of carrying inventory often exceed net profits for the individual shoe manufacturers. A number of factors contribute to large inventory costs for shoe manufacturers. They include the large number of shoe size widths; consumer demand for variety; cycles in sales, production, inventories, and leather prices; frequent style changes; increasing retailer demand for in-stock service; information and transportation delays; and lack of current consumer-demand data. Retail walkouts substantially reduce profit potential for shoe manufacturers as well as retailers. These and other factors make efficient inventory management a difficult problem that is too complex for solution by traditional methods. However, because inventories are so large and important in the shoe industry, and because of two relatively new tools for inventory management, opportunities for improvement of profits through inventory management are especially good in the shoe industry.

Two post-World War II developments — scientific inventory control and electronic data processing (EDP) — now provide unprecedented opportunities for improvements in inventory management. By using scientific inventory control, some companies in various industries have reduced inventories by as much as 50 percent and simultaneously have given improved delivery to their customers. Some large shoe companies, now only in the early stages of applying EDP and scientific inventory control, have achieved or expect to achieve inventory cost reductions of 20 to 40 percent, and at the same time improve customer service.

Electronic data processing refers to the use of electronic computers for much faster and more accurate handling of large quantities of information. EDP alone can offer major gains in inventory management through reduction of clerical costs, faster use of up-to-date information, and reduced data-handling errors. Scientific inventory control refers to the use of mathematical analysis to develop better inventory policies so that the best customer service can be offered at the lowest cost. Scientific inventory control can be used without EDP, and for some small companies that cannot afford use of computers this is the best strategy — but EDP permits much more sophisticated and effective use of scientific inventory control by permitting rapid and systematic mathematical analysis of large quantities of data. For most medium and larger companies, EDP and scientific inventory control together can offer the greatest gains.

These new techniques offer the highest potential gains to integrated or branded manufacturers with large finished-goods inventories, but they can also provide significant benefits to all manufacturers in management of raw-materials inventories.

Although traditional methods of inventory management still predominate in the shoe industry, there is an accelerating trend among the leaders toward use of EDP for inventory control and for other uses. At present, there is very little use of scientific inventory control in the shoe industry, even among the companies using EDP, but there are indications that several companies will soon be using scientific inventory control. Computer companies have recently made major advances in developing new ways of helping industries like the shoe industry to improve inventory management. Within a few years, use of both EDP and scientific inventory control will accelerate in the shoe industry, and the leaders in these areas will have gained a major competitive advantage in efficiency and in merchandising.

Thus, there are strong reasons for each individual shoe manufacturer to actively pursue the opportunities in EDP and scientific inventory management — to investigate the potential gains to the company and to introduce these new methods of inventory management where they prove economical.

But this is not the only area of promise. These same techniques offer the same opportunities to shoe retailers. Manufacturers' cooperation with retailers in certain areas of inventory management, through EDP and scientific inventory management, offers manufacturers further benefits — including more dependable and up-to-date information on retail sales, more efficient schedules of shipments to retail outlets, and increased sales resulting from improved retailer inventory-service levels.

The majority of shoe manufacturers do not now receive up-to-date, accurate data on the retail sales of their products. This "information gap" creates a need for manufacturers to obtain the cooperation of retailers in capturing point-of-sale data and transmitting it on a timely basis to the manufacturers. Such feedback data would be valuable to manufacturers in establishing consumer-demand patterns, forecasting future demand, adjusting production schedules and inventories in anticipation of demand, taking timely markdowns, and planning introduction of new styles. Conversely, retailers can benefit from services provided by manufacturers such as source marking and automatic stock replenishment. Retailers with EDP facilities can also benefit from manufacturers supplying them with shipment data in a machine-language format. This would permit entries to the retailers' computer-inventory records to be made readily upon receipt of shipments, without the expense of preparing punched cards or other input media. A system that reduces lost sales due to walkouts by keeping the retailer in stock with items customers want is needed by both retailers and manufacturers. Although the loss to a retailer from walkouts is immediate and direct, the cost to manufacturers due to lost sales resulting from retail walkouts is substantial. Automatic stock-replenishment agreements between retailers and manufacturers can reduce lost sales for both through improved retailer in-stock service of manufacturers' products.

On the basis of the opportunities for profit improvement for shoe manufacturers through inventory management, it is recommended that scientific inventory control and EDP systems be implemented by shoe manufacturers where economically justified. Smaller companies that cannot justify acquisition of EDP equipment can often justify use of service-bureau EDP facilities. When this is not economically feasible, companies should still investigate the use of scientific inventory control as a powerful tool for reducing inventory costs and improving customer service. It is also recommended that manufacturer-retailer data sharing and automatic replenishment of retailer stock be investigated and implemented wherever possible. In order to implement the latter recommendation fully and effectively, a universal coding language for marking shoes should be developed, and studies should be conducted of (1) methods of source marking shoes with

stock-keeping-unit data, (2) methods of capturing such data at the point of sale to the consumer, and (3) methods of transmitting data from the retailer to the manufacturer.

One particular technique of management science — simulation — has been used to study ways of reducing the adverse effects of business cycles in several industries. One of the best known simulation techniques is industrial dynamics, developed at M. I. T. in the last 10 years. It is likely that a study of this type could lead to significant cost reductions for the shoe industry by providing insight into causes of industry cycles, permitting cost-reducing industry-policy changes. A preliminary study should be undertaken for the shoe industry to explore the potential, and if results are positive, a full shoe-industry simulation research program should be carried out.

INTRODUCTION

The control and maintenance of inventories is a management problem common to all manufacturing industries. Inventories require substantial investments that often constitute a large percentage of a company's total assets. The costs that are incurred on an annual basis as a result of carrying inventories sometimes exceed the net profits of a company. In the shoe industry, where inventories are particularly high relative to profits, annual inventory costs often exceed net profits. However, the potential for profit improvement through inventory management is exceptionally good in the shoe industry.

This report (1) examines the characteristics and problems of shoe-industry inventories, (2) describes the basic features of scientific inventory control, (3) examines the status of inventory management in the shoe industry, and (4) recommends possible means of inventory improvements in the shoe industry through scientific inventory control, electronic data processing, manufacturer-retailer data sharing, and integrated inventory management.

SHOE-INDUSTRY INVENTORY CHARACTERISTICS

General shoe-industry inventory statistics are given in this section to indicate the industry potential for cost savings through inventory reductions. A discussion of specific inventory problems of the shoe industry follows the discussion of inventory statistics.

Statistics

Shoe manufacturers typically have 25 to 55 percent of total assets invested in inventories. Inventories as a percentage of assets ranged between 29 and 53 percent for the top eight United States shoe manufacturers in 1964, as shown in Table 1.[1]*

Estimated inventory carrying costs exceeded net profits for five of the top eight United States shoe manufacturers in 1964, as shown in Table 2[1] (assuming an annual carrying cost of 20 percent of average inventory investment, as estimated by the National

*References appear in Appendix E.

Footwear Manufacturers Association (NFMA),* and assuming that year-end inventories represented average inventories for the year). These five companies account for approximately 25 percent of the industry's pairage output and an even larger percentage of industry dollar sales. Such high inventory carrying costs are also typical of smaller branded** shoe manufacturers. On the other hand, the unbranded*** shoe manufacturers, who produce to order and carry very little finished-goods inventory, are able to maintain a relatively low inventory investment.

TABLE 1. INVENTORIES AS PERCENTAGE OF TOTAL ASSETS FOR MAJOR UNITED STATES SHOE MANUFACTURING COMPANIES[a][1]

Company	Inventories as Percent of Total Assets (1964)
Genesco, Incorporated	46
International Shoe Company	33
Brown Shoe Company	40
Shoe Corporation of America	53
Endicott Johnson Corporation	52
U. S. Shoe Corporation	42
Wolverine Shoe and Tanning Corporation	29
Melville Shoe Corporation	48

(a) Term "manufacturing company" includes integrated companies that manufacture shoes and own retail outlets.

TABLE 2. COMPARISON OF NET PROFITS AND INVENTORY CARRYING COSTS FOR 1964[1]

Company	Net Profit as Percent of Sales	Estimated Inventory Carrying Costs as Percent of Sales
Genesco, Incorporated	2.2	4.4
International Shoe Company	2.4	4.0
Brown Shoe Company	5.0	4.4
Shoe Corporation of America	1.5	3.3
Endicott Johnson Corporation	0.9	7.0
U. S. Shoe Corporation	5.8	3.9
Wolverine Shoe and Tanning Corporation	8.6	3.1
Melville Shoe Corporation	3.6	3.7

*Verbal communication from Dr. Merrill Watson, Executive Vice-President, NFMA, August 18, 1965. (See Appendix B for explanation of factors that contribute to inventory carrying cost.)

**"Branded" in this report refers to "manufacturer's brand", defined in Reference (2) as including "any trademark owned and promoted by a manufacturer or by an integrated manufacturer-retailer company."

***"Unbranded" in this report refers to shoes that do not have a manufacturer's brand; this corresponds to "distributors' brand", defined in Reference (2) as including "any trademark owned and promoted by any retail or wholesale distributor, including 'unbranded shoes' or 'private labels'."

Inventories as a percentage of sales are compared in Figure 1 for companies of different size in the leather and leather-products industry.* It is seen that the average level of inventories as a percentage of sales for large companies is generally greater than the level for smaller companies. The explanation for this variation of inventory level with company size appears to be that a majority of the large shoe manufacturers primarily produce branded shoes for stock, and many own retail outlets, both of which require large finished-goods inventory. A large percentage of the smaller shoe manufacturers produce primarily unbranded shoes to customer order and do not own retail outlets. According to National Footwear Manufacturers Association data, approximately 52 percent of all shoes produced in the United States are unbranded, based on pairage, and approximately 45 percent are unbranded, based on dollar value.

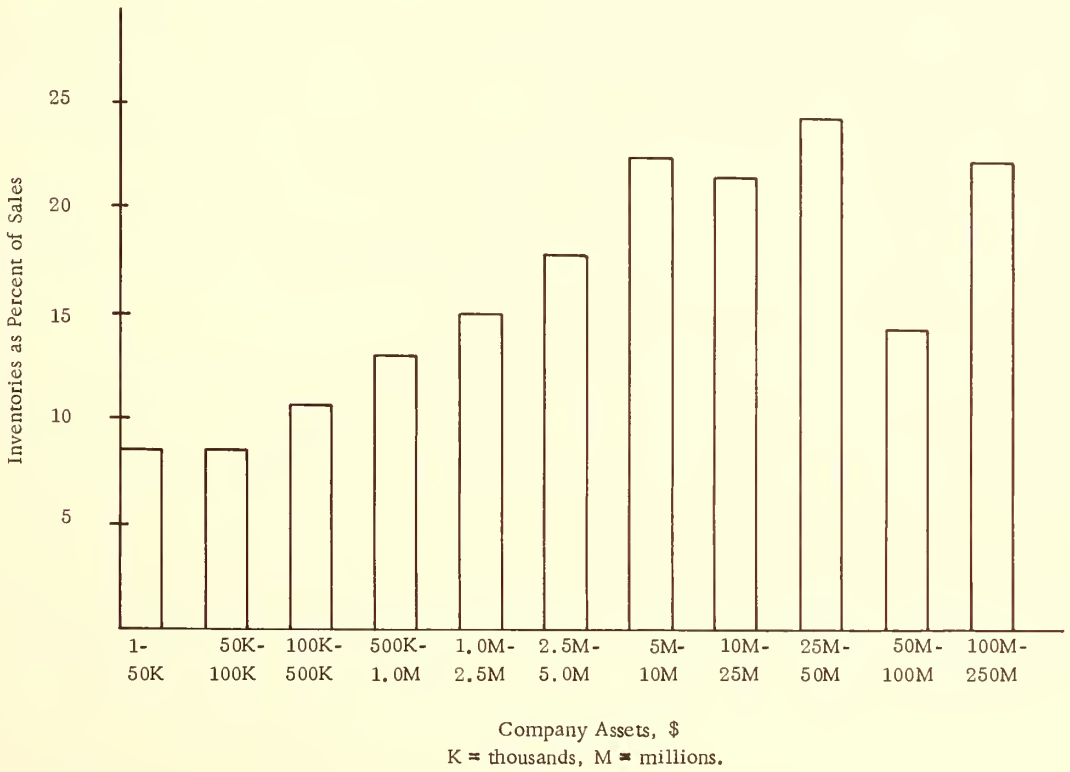


FIGURE 1. INVENTORIES (BY COMPANY SIZE) AS PERCENTAGE OF SALES[3]

Raw materials and work-in-process inventories combined typically average about 8 percent of sales for both branded and unbranded manufacturers, whereas finished-goods inventories typically range from 10 to 20 percent of sales for branded manufacturers.[3,4] Thus, the largest potential for profit improvement through improved inventory management exists for the branded-shoe manufacturers, and for these manufacturers, finished-goods inventories offer greater potential for profit improvement than either raw-materials or work-in-process inventories.

*In terms of annual sales, the leather and leather-products industry, hereafter referred to in this report as the "leather and shoe industry", is approximately two-thirds shoe manufacturing.

It appears likely that shoe manufacturers' investment in raw materials will decline in future years because of the increasing use of synthetics, such as Corfam, which should stabilize leather prices somewhat and reduce the industry's dependence on this commodity of cyclic prices. Leather constitutes the largest cost element in the raw-materials inventory in the shoe industry. As an example, a prominent women's shoe manufacturer had 83 percent of its raw-material inventory investment in upper and bottom leathers at the end of its 1965 fiscal year. Because of the frequent, relatively large fluctuations in leather prices, many shoe manufacturers purchase quantities of leather far in excess of the "economic order quantity"* as a hedge against leather-price increases. Consequently, raw-materials inventories for many companies would be less if shoe-material prices were more stable.

It also appears likely that investments in work-in-process inventories will decline as the efficiency of production operations is improved through new production techniques, automatic equipment, plant layout, and other means. A number of shoe manufacturers have introduced major improvements in production operations in recent years. Wolverine Shoe and Tanning Corporation installed new transporters in 1962 to move materials to and from work stations in making shoe uppers, and this equipment contributed to a substantial increase in production output. Wolverine has also developed a machine for automatically trimming edges of crepe soles, and it has improved plant layout.(5) Genesco has developed a molding process called Genlite, in which women's shoes are made so that the bottom and a major portion of the upper is a single piece of material. Genesco, which has been in the forefront in the use of Corfam, Du Pont's revolutionary new poromeric material for shoe uppers, has stated its belief that Corfam will pave the way for automation in shoemaking because of its uniformity.(6)

Mr. T. R. Volenetz, vice-president of Brown Shoe Company, has listed very impressive gains in production achieved through Brown's plant conveyorization program: 30 percent reduction in work-in-process inventories, 15 percent gain in productivity, reduced direct-labor cost per pair, and improved shoe quality through reduced plant congestion.

Thus there are opportunities for major reductions in work-in-process inventories through production improvements. The most promising opportunities in this area are related to development of new production processes and therefore depend on shoe production and materials research and development. These opportunities are discussed in more detail in the companion Battelle report on research and development in the shoe industry.

The largest potential for inventory cost reduction in the shoe industry as a whole, especially for the branded manufacturers, is in finished-goods inventories, because this is the category in which the largest inventory investment now exists, and because the trend will probably be toward smaller raw-materials and work-in-process inventories. For the many unbranded shoe manufacturers, however, the largest potential for inventory cost reduction is in raw-materials inventories, and there are opportunities for all manufacturers to reduce work-in-process inventories through improved production efficiency.

Estimates of the 1964 dollar volume of shoe flow from manufacturers to consumers by various channels, together with estimates of turnover and inventories at each stage of the distribution system, are presented in Figures 2 and 3. These data indicate that the

*In scientific inventory control, "economic order quantity" is the order quantity that minimizes the costs which are relevant to inventory policy.

inventory investment for all levels of the United States shoe industry totaled about $1.5 billion in 1964, as shown in Table 3.* This figure is in agreement with National Footwear Manufacturers Association estimates. Of this total, manufacturer-owned inventories are estimated at about $582 million, including approximately $108 million in retail inventories owned by integrated companies. These large industry investments indicate that a substantial potential exists for inventory reductions in the shoe industry and that investigation of possible methods of inventory reduction is warranted.

Based on the estimates of raw-materials inventories for all manufacturers ($115 million) and finished-goods inventories for branded manufacturers only ($232 million) given in Table 3 and Figure 2, respectively, an industry-wide reduction of 10 percent in inventories would reduce shoe manufacturers' investment in inventories by about $35,000,000, and should reduce inventory costs by about $7,000,000 per year, based on a 20 percent inventory carrying cost. A 25 percent reduction in inventories should reduce inventory investment by about $87,000,000 and annual inventory costs by about $17,000,000. The potential for inventory reduction at the retail level is even greater. A 25 percent inventory reduction for all shoe retailers should reduce retailers' investment in inventory by about $235,000,000 and should reduce annual retail inventory costs by about $47,000,000.

TABLE 3. SHOE-INDUSTRY INVENTORY LEVELS

Millions of Dollars

Manufacturers' Inventories				Nonmanufacturers' Inventories		Total Shoe-Industry Inventories
	At Factory and Warehouse	At Retail	Total			
Raw Materials	115[7]	--	115	Wholesale	18[a]	
Work in Process	53[7]	--	53	Retail	940[b]	
Finished Goods	360[a]	108[b]	414			
TOTALS	474	108	582		985	1,540

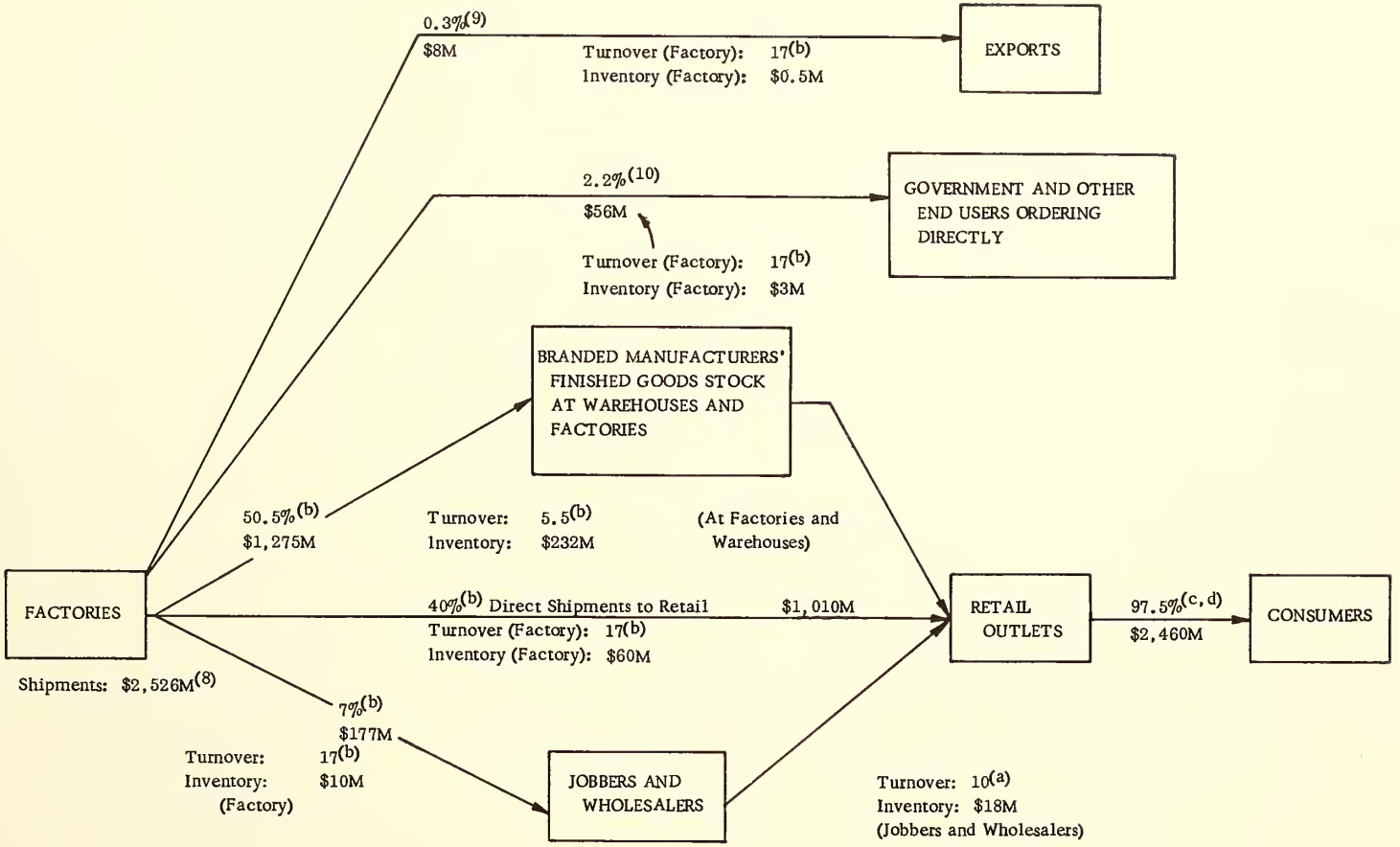
(a) Data from Figure 2.

(b) Data from Figure 3.

Note: Numbers in parentheses refer to references listed in Appendix E.

By using scientific inventory control, some companies in various industries have been able to reduce their inventories as much as 50 percent and simultaneously to give improved delivery to the customer.[14] Inventory reductions of such magnitudes would not necessarily be feasible for an entire industry. However, a number of individual companies in the shoe industry may well have the potential for inventory reductions of such magnitudes. Some major integrated shoe companies already have reduced or expect to reduce inventories by 20 to 40 percent through the use of new inventory-management methods. Clearly, such reductions provide major gains both in freeing capital and in increasing profits.

*Data in Table 3, which are based on estimates in many cases, are presented to indicate order-of-magnitude approximations of shoe-industry inventory investments and potential for cost savings through inventory reductions.



M = Million

FIGURE 2. ANNUAL SHOE FLOW FROM MANUFACTURERS(a)

All dollar figures are based on 1964 factory prices

(a) See additional notes for Figure 2 given with Figure 3.
(b) Based on estimates from shoe-industry and/or association executives.
(c) Obtained by addition.
(d) Breakdown by type of retail outlet is given in Figure 3.

	Percent of Category		Inventory, millions of $	
	Manufacturer Owned	Nonmanufacturer Owned	Manufacturer Owned	Nonmanufacturer Owned
20.8%[11] → $512M → Shoe Chains	50[10]	50[10]	$ 73M	$ 73M
Turnover: 3.5[a] Inventory: $146M				
26.2%[11] → $645M → Independent Shoe Stores	0	100	0	323M
Turnover: 2[a] Inventory: $323M				
9.9%[9] → $244M → Leased Departments	50[a]	50[a]	35M	35M
Turnover: 3.5[a] Inventory: $70M				
40.1%[b] → $985M → Department & General Merchandise Stores	0	100	0	493M
Turnover: 2[13] Inventory: $293M				
3.0%[12] → $74M → Catalog and Door to Door	0	100	0	16M
Turnover: 4.5[a] Inventory: $16M				
Total: 100 percent $2,460M			$108M	$940M

M = Million

FIGURE 3. RETAIL SHOE FLOW

All dollar figures are based on 1964 factory prices

(a) Based on estimates from shoe-industry and/or association executives.
(b) Obtained by subtraction.

Additional notes for Figures 2 and 3:

A. Turnover figures are based on estimates of number of stock turns per year, defined as annual dollar shipments divided by average inventory.

B. Inventory figures at each stage of the distribution system were obtained by dividing the estimated dollar values of shipments by the estimated turnover.

C. Numbers in parentheses refer to references in Appendix E.

Features and Problems of Shoe-Industry Inventories

A number of factors generally contribute to the high inventory carrying costs sustained by United States shoe manufacturers. These factors include the large number of size-widths now required for proper fit; increasing consumer demand for larger assortments and greater variety in styles, colors, materials, and finishes; frequent style changes requiring markdowns; cycles in sales, inventory, production, and leather prices; seasonality of demand; increasing retailer demands for in-stock service; increasing number of retailers; information and transportation delays; lack of current consumer-demand data; and increasing labor costs for manual inventory systems. Lost sales due to retail walkouts* substantially reduce profit potential for shoe retailers directly and for shoe manufacturers indirectly. These problems are discussed below.

The high inventory carrying costs; lost profits due to walkouts; intense competition, both foreign and domestic; and changing consumer buying patterns create a significant need for United States shoe manufacturers to utilize the best available tools to manage inventories.

Multiplicities

United States shoe manufacturers make almost 300 different sizes and widths for men, women, and children, which the National Shoe Institute has said is "three times more of an assortment than is available in all other nations combined".[15] International Shoe Company has reported stocking about 12,000 shoe stock numbers in 20,000 widths and over 200,000 sizes.[16] Recommendations for a new men's last-grading system that would reduce the number of size-widths of men's shoes, thereby reducing men's shoe inventories by 20 percent, are discussed in the separate Battelle report on "A Last-Grading System for the Men's Shoe Industry". Potentials may exist for similar reductions in the number of size-widths of women's and children's shoes.

As the standard of living has risen in the United States, consumers have demanded shoes in wider assortments of styles, colors, materials, finishes, and functions. This trend has been rightly encouraged by the shoe industry as a stimulus to greater sales, but it has required that larger inventories be carried by the industry to satisfy demand. Expanded assortments have increased the need for detailed inventory information and improved inventory-control methods to assure maintenance of balanced stocks.

There are over 800 shoe manufacturers in the United States. The large number of factories, warehouses, and retailers in the shoe industry causes large industry-wide inventories because each operation requires a certain minimum inventory to serve its customers. In general, the more warehouses and stores serving a given number of customers, the greater the total inventory requirement will be.

Retail Walkouts

Estimates of walkouts in retail shoe stores generally range between 15 and 40 percent of sales. The recent study of consumer attitudes towards shoes conducted by Elmo Roper and Associates[17] found that 37 percent of the women respondents and 24 percent

*A walkout occurs when a retail store is unable to satisfy a customer's request for merchandise, and a sale is lost as a result.

of the men respondents have "problems in finding shoes they like in their size". This indicates that a substantial percentage of the population represents potential walkouts when shopping for shoes.

A recent study of walkouts in retail stores carrying a variety of merchandise, which was conducted by IBM, indicated that for every $100 spent by consumers in stores an additional $90 would have been spent if all needs of the consumer had been met.[18] The IBM study also indicated that over 95 percent of walkouts in retail stores of all types occur because the retailer does not have in inventory the size, style, color, etc., that the customer wants. To a retailer, a walkout represents a lost-sale cost — a major cost that scientific inventory control can often reduce sharply. Although all walkouts do not represent lost sales for manufacturers, it is certain that some do by leading the customer to buy a competitor's shoe or to go home without buying. For any particular manufacturer, it is a matter of vital importance for retailers to carry a balanced inventory of his products to avoid excessive walkouts. In interviews with retail-store managers and buyers conducted to establish the existence of problem areas that had potential for improvement, IBM found that controls related to inventories were mentioned as needing improvement far more often than any other problem areas.[19]

The contribution of walkouts to retailer costs through lost sales is obvious. The adverse effect of retail walkouts on manufacturers is less apparent, but it is real. Some of the retail walkout customers, of course, satisfy their demand by shopping in a second or third retail store until they find the desired item. Many other customers accept substitute items. Still others, however, unable to find the desired item, fail to satisfy their demand, and no item is purchased. The extent to which each of these possibilities occurs is unknown. The special importance of retail walkouts to a branded manufacturer can be illustrated by the following example and Table 4.

TABLE 4. CHANCES OF CUSTOMER NOT FINDING A MANUFACTURER'S PRODUCT VERSUS RETAIL SERVICE LEVEL AND NUMBER OF STORES VISITED

Retail Service Level (All Stores), percent	Chances of Customer's Not Finding a Manufacturer's Product, According to Indicated Number of Stores Visited		
	1	2	3
50	.50	.25	.125
60	.40	.16	.064
70	.30	.09	.027
80	.20	.04	.008
90	.10	.01	.001
95	.05	.0025	.000125

If all stores selling a manufacturer's brand of a product line maintain an in-stock level of 60 percent,* then the chances of a customer's not finding a particular item of the brand in one store are .40. If he shops in two stores, the chances of not finding the item drop to .16, and for three stores, .064. On the other hand, if all stores carrying the brand maintain an in-stock service level of 95 percent, then the chances of a customer's

*An "in-stock level" is defined as the retail inventory level at which a given percentage of customers will find the item requested in stock.

not finding a particular item of the brand in one store are .05; if he shops in two stores the chances fall to 0.0025; for three stores they are .000125. Therefore, assuming brand loyalty of a consumer to the extent that he would shop in three stores to find the branded item he wants, a manufacturer could reduce the chances of a lost sale from 640 in 10,000 to less than 2 in 10,000 by improving the in-stock service level of the retail stores carrying his brand from 60 percent to 95 percent.

The prevalence of style copying by shoe manufacturers tends to reduce brand loyalty in many cases. When this occurs, customers are more willing to accept substitute items. Then it is even more important to a manufacturer for retailers to maintain high in-stock service levels of his products in order to minimize his lost sales resulting from retail walkouts or brand switching.

Markdowns

Data published by the National Retail Merchants Association indicate that markdowns of shoes in department stores range from an average of 6.2 percent of net sales for men's and boys' shoes to an average of 13.7 percent of net sales for women's better shoes.[20] Markdowns are necessary to permit retailers to sell seasonal and fashion shoes when consumer demand is insufficient at the original price. The lost profit on markdowns is a key cost element that scientific inventory control can help to make as low as possible, considering all factors. Although the manufacturer does not directly sustain a loss due to retailer markdowns (except in an integrated company), if he is an in-stock manufacturer, he is also likely to have excess inventories of the slow-selling styles that are being sold as markdowns at retail and be forced to sell his excess stock as markdowns also. Early knowledge of sales trends is necessary to permit manufacturers and retailers to avoid excess inventories of slow-selling styles, and thereby to reduce losses due to markdowns.

Seasons and Cycles

It is well known that retail shoe sales, as well as shoe manufacturers' inventories and production, sustain seasonal fluctuations. Data for 1959 through 1963 indicate that retail sales normally reach major peaks in April and December and a minor peak in September of each year, and manufacturers' production normally reaches peaks in March and August of each year.[4] The large seasonal fluctuations in retail sales, which are reflected in orders received from retailers, create difficult problems for shoe manufacturers in maintaining a balance between proper inventory levels and efficient production schedules. If a manufacturer stabilizes production at a uniform level, then inventories must fluctuate to accommodate sales peaks and valleys. This entails risks when large inventories of seasonal styles are built up before market acceptance is known. Conversely, if inventories are stabilized, production must fluctuate to provide the merchandise ordered by retailers, causing factory inefficiencies.

In addition to the seasonal variations, other fluctuations in manufacturers' production, inventories, and leather costs can result from information and transportation delays coupled with changes in retail sales. Such fluctuating behavior of key variables has been found to exist in distribution systems of a number of industries.

The technology of industrial dynamics* and several other simulation techniques have been applied to the study of the cause and effect of such variations in several industries. Such studies have shown that fluctuations in orders from retailers to their suppliers are often significantly greater in amplitude than the retail-sales fluctuations and that factory-production output often fluctuates to an even greater extent. Furthermore, it has been found that the factory-production fluctuations often lag the retail-sales fluctuations to such an extent that the production rate continues to increase long after sales have started to decrease. This type of behavior in a distribution system results primarily from information and transportation delays. Such fluctuations can result in (1) overproduction of certain shoe styles and a subsequent loss through markdowns, (2) underproduction of other styles and a loss because of inadequate inventories, or (3) excessive changes in production rate that are costly because of overtime, inefficiencies, and other factors. They can be reduced by improved information systems and better inventory policies. Simulation techniques such as industrial dynamics can be used to study causes of such fluctuations and to determine effects of new policies before they are implemented.

A remarkably exhaustive study of cycles and fluctuations in the shoe-leather-hide sequence, primarily for the period 1919-1941, was conducted by Ruth P. Mack of the National Bureau of Economic Research and published in 1956.[22] She found that retailers' orders (seasonally adjusted) fluctuated considerably more than retail shoe sales and that shoe production, although smoother than new orders received from retailers, nevertheless varied a great deal more than consumer shoe purchases.

Mack's study was based on data which are now at least 25 years old, and no firm conclusions about today's problems in the shoe industry can be drawn from it. However, computer simulation techniques, such as industrial dynamics, which have been developed in the last ten years, now provide unprecedented opportunities for investigating the time-varying behavior of an industry and the cause-and-effect interrelationships of flows of information, money, orders, materials, and other variables in a manner that can lead to cost-reducing new policies.

Information Gap

In order for a shoe manufacturer to scientifically control finished-goods inventories, he must have accurate and timely information regarding retail sales. Although retailers' orders to manufacturers determine each shipment by a manufacturer, the ultimate determinant of manufacturers' sales is retail sales. Quite often, however, the only retail-sales information available to the manufacturer is based on salesmen's reports and purchase orders received from retailers. In many cases, such information is not up-to-date and does not give a true indication of latest retail sales and sales trends.

When point-of-sale data are not captured by independent retailers, the typical frequency of physical inventory counts is about once per month. A survey of department stores showed that the typical frequency of review of inventory position was once every 4 weeks.[19] Data obtained at monthly intervals are not sufficiently timely for an inventory policy based on current shoe-sale trends. Even when point-of-sale data are captured by retailers, the quantities ordered by retailers depend on their predictions of future demand as influenced by their judgment, the available budget, and other factors, as well as actual consumer purchases. This can make retailers' orders very misleading to manufacturers. Since orders from retailers are often neither timely nor accurate

*A simulation technique of management science developed by J. W. Forrester of M.I.T. for investigating the time-varying behavior of industrial and economic systems.[21]

indicators of consumer purchases, the manufacturer usually does not have direct access to information on his ultimate sales determinant — retail sales. Thus, a costly information gap exists for the majority of shoe manufacturers with respect to retail sales of their products.

NEW TOOLS FOR IMPROVED INVENTORY MANAGEMENT

Emergence of New Tools

Starting in World War II and developing at an accelerating pace in the postwar period, two powerful new tools for improved management of inventories have emerged on the American business scene: electronic data processing (EDP) and scientific inventory control.* Since World War II, the capabilities of the computer for business applications have continued to grow at a very rapid rate. It is now used very widely for rapid routine handling of large quantities of business data.

Simultaneously, initial military work and subsequent research for both military and business applications have led to rapid advances in scientific inventory control — the use of mathematical techniques of analysis to develop more effective and lower-cost inventory policies. Advances in EDP have been an important contributor to advances in scientific inventory control because EDP permits rapid and efficient handling of complex data and mathematical "models" of inventory systems. Together, EDP and scientific inventory management today represent a very powerful set of tools for achieving improved customer service at lower cost.

The opportunities for better inventory management with these tools continue to expand. As explained elsewhere in this report, two major computer companies — IBM and NCR — have introduced major new inventory systems for retailers this year. Computer service bureaus are expanding rapidly, making use of computers possible for smaller companies that cannot afford their own computers. The cost of using computers is falling rapidly.

What the Tools Can Do

EDP is the use of electronic computers for data handling. Basically, it permits more rapid, more accurate, and in many cases less costly handling of large quantities of information.

Typically, a company beginning to use EDP first applies this tool to performance of routine clerical tasks. Such tasks in the inventory-management area would include rapid compilation of retail orders from many stores; other similar tasks, such as payroll processing, are also often included.

In the second stage of use, EDP is used as an aid in carrying out predetermined inventory policies and in performing the necessary calculations. For example, if a

*The term "scientific inventory control" denotes the scientific use of mathematical analysis to establish inventory policy. See Appendix A for a discussion of scientific inventory control.

company wanted to provide a certain in-stock service level for a particular shoe style, the computer could be programmed to calculate the reorder point, economic order quantity, and automatically issue an order for more shoes at the proper times.

In the third and most sophisticated stage, the computer is used as an experimental tool in combination with scientific inventory control, to help managers develop new and better inventory policies. For example, these tools could be used to test the effect on costs of changing in-stock service levels.

Scientific inventory control refers to the use of mathematical analysis for the development and testing of new and better inventory policies. Basically, this technique permits the manager to (1) improve the quality of customer service and (2) reduce total inventory cost by mathematical analysis. Thus, the manager can, by comparing effectiveness and costs of various policies, determine the policies that best suit his objectives. Mathematical analysis is particularly useful in the inventory area of business because the various effectiveness and cost factors can be represented accurately by mathematical equations. A more detailed explanation of scientific inventory control is provided in Appendix A.

Scientific inventory control has been made much more effective by development of EDP, as stated above, because EDP permits rapid, accurate, low-cost handling of inventory data and use of mathematical techniques. For the medium and larger shoe companies that have complex inventory situations and can afford use of a computer, combined EDP and scientific inventory control offer the greatest potential, but small companies that cannot afford computer time can also gain from scientific inventory control.

STATUS OF SHOE-INDUSTRY INVENTORY MANAGEMENT

Scientific inventory control and electronic data processing have been combined for inventory management by only a few shoe manufacturers and retailers. However, the trend is strongly upward, and the companies introducing these methods will gain economic and merchandising advantages.

Manufacturers' Use of Electronic Data Processing

A National Footwear Manufacturers Association data-processing survey of shoe manufacturers, conducted in 1965, indicates that manual methods of inventory control predominate in the shoe industry.[23] However, a definite trend exists in the shoe industry toward implementation of electronic data-processing systems for inventory control and many other applications. The 1957 NFMA data-processing survey indicated that none of the 154 reporting companies had computers* in use for any application at that time. In the 1965 survey, 17 of the 103 reporting companies owned or leased computers of their own, and several others used service-bureau computers; 12 of the 103 reporting companies reported the use of computers for finished-goods inventory-control applications, and 10 used computers for raw-materials inventory control. In addition to the 17

*Computers were defined by NFMA for the purposes of its survey as "stored program equipment only".

companies that reported having computers in the NFMA 1965 survey, at least 6 other shoe manufacturers are known to own or lease computers, the majority of which are used for inventory-control applications.

Genesco has reduced shoe inventories by 40 percent over the last 5 years, while increasing sales, through use of EDP in various ways; and their uses of EDP have also helped retailers with whom they deal. For example, Genesco has been able to develop through EDP better information on the relative popularity of various sizes and widths in various regions. Two other companies now introducing EDP have made studies of potential gains and expect to cut costs by 20 to 30 percent while improving customer service.

Green Shoe Manufacturing Company has recently installed a computer system and is programming it for inventory control and other advanced applications. According to Footwear News[24]:

> The children's shoe manufacturer has moved into the vanguard of computer users in the footwear industry.
>
> "The new system," according to Myles Slosberg, executive vice-president, "now does the billing, payroll, leather analysis, and some sales analysis, all of which were performed by the punch-card equipment. In addition, it provides a complete inventory report — giving daily sales, stock, and production figures by style, size, and width.
>
> "It also helps us determine labor loading — that is, how many people will be needed for a particular job, and to more accurately reorder our supply of shoe parts. Through this latter information, the computer will eventually be doing, in effect, our purchase orders.
>
> "Also, we plan on feeding the system with certain information, which will enable it to give us the minimum stock levels we must have on hand to meet future business. With over 14,000 items offered, this will free some of our management people from this kind of work for other functions.
>
> "We also expect to utilize the new system for sales forecasting."

At a recent management seminar organized by the Shoe Manufacturers Association of Canada, Donald G. MacLeod, vice-president and treasurer of Savage Shoes, Ltd., Preston, Ontario, a division of International Shoe Company, St. Louis, Missouri, stated his opinion that all companies doing over $500,000 volume a year will be using a computer by the mid-1970s. "The day of deciding 'Will we or won't we?' is past," he declared. "The question now is really one of when and how."[25]

Manufacturers' Use of Scientific Inventory Control

Although a significant number of shoe manufacturers now have computer installations, it is evident that the majority of even these companies are not yet using scientific inventory control. Many of the companies that own or lease computers use them in inventory applications essentially as a record-keeping device, replacing clerical labor. In such cases, order quantities and inventory levels are still established for each item by

intuitive judgment, but this is often the first stage in the evolution of computer applications in a company. A few of the shoe manufacturers with computers have advanced to computer implementation of scientific inventory control, and several others certainly will shortly.

Mr. Leonard Vogt, Merchandising Manager of International Shoe Company, has described EDP as "a tremendous force in inventory management", and has explained one way in which EDP has helped International to improve inventory policy. After International had put its inventories on computer, the computer provided information indicating that International could lower inventory costs by developing its own trucking force for transporting raw materials and finished goods between plants. International has established such a trucking force, and is quite pleased with the resulting cost reductions.

Mr. Vogt stated that prompt elimination of unpopular styles is one of the most promising ways of cutting unnecessary inventory costs and complexity, and pointed out that rapid processing of complete information by computer can be of great help in this area. Mr. Joseph Helmbacher, Vice-President of Brown Shoe Company, has also listed quicker elimination of unpopular styles as one of the most promising areas of improved shoe-inventory management.

Retailers' Use of EDP and Inventory-Control Programs

The use of EDP by retailers is important to shoe manufacturers because of the opportunities provided for data sharing, automatic replenishment of retailer stock, and better and more efficient retail merchandising of manufacturers' products.

Retailers have until very recently been slow to adapt electronic data processing to their needs.[26,27] The first computers appeared in retailing in 1958; however, the rate of EDP implementation by retailers is now accelerating. Mr. William D. Power, a partner in Touche, Ross, Bailey, and Smart, an independent auditing and management services firm active in the retail trade, recently stated that "Three years ago relatively few stores had computers; today almost every store of any consequence has a computer or an order in for one."[26] At a news conference at the 1966 National Retail Merchants Association (NRMA) convention, Mr. James J. Bliss, Executive Vice-President of NRMA, predicted that the impact of automation would accelerate. He said, "What it costs $1 to get in EDP capacity today will be available for as little as 2 to 3 cents before 1970".[28] To use a computer in 1970, a company must begin planning and preparing now.

Two computer manufacturers — International Business Machines Corporation and National Cash Register Company – recently announced comprehensive computer programs and control techniques for retail inventory mangement. Both systems were announced the week before the National Retail Merchants Association's 55th annual convention held in New York City from January 9 through January 13, 1966.

IBM stated that its system, called Retail IMPACT (Inventory Management Program and Control Techniques), represented the "most significant announcement IBM ever made to the retail industry".* Retail IMPACT consists of two independent computer program packages, one for staple merchandise and one for fashion goods. IBM spent about six years and several million dollars developing Retail IMPACT. It has been tested in

*IBM presentation and demonstration of Retail IMPACT at National Retail Merchants Association 55th annual convention, New York, New York, January 12, 1966.

several pilot retail installations over a period of several years, with the following composite results reported by IBM:

Lost sales:	Down 80 to 90%
Turnover:	Up 15 to 51%
Sales:	Up 11 to 28%
Change in level of service:	Up 11 to 29%
New level of service maintained:	Up 97 to 99%

Various output reports are available from Retail IMPACT: reports on vendor-performance analysis, reorder recommendations, return or markdown recommendations, interstore transfer candidates, sales forecasts, and simulation of service and inventory levels resulting from different inventory policies. Retail IMPACT will (1) permit automatic reordering by determining what, when, and how much to reorder and by printing the purchase orders, (2) rate vendor performance, and (3) provide early recognition of differing-style sales patterns so that profitable styles can be reordered, unprofitable styles can be eliminated, and timely markdowns can be taken.

NCR's REACT (Register Enforced Automated Control Technique) was the result of 60 man-years of research and development.[29] REACT assures that all unit stock data are captured at the point of sale, as the cash register will not open until the proper number of keys are depressed. The cash register produces data in the form of punched paper tape or optical font tape* that are then processed by a computer to update sales and inventory records, calculate economic order quantities for staple items whose inventory has fallen below a minimum level, and automatically print purchase orders. An NCR test in shoe chain stores indicated an accuracy of 98.4 percent for unit recording of sales by cash register. NCR reports[30] the test results as follows:

> "Users generally agree that with proper training a high degree of accuracy can be expected from sales people. However, a special test of recording accuracy in the use of non-dollar figures was recently conducted by NCR Systems Research in cooperation with the National Association of Shoe Chain Stores.**
>
> "Special registers were installed in ten busy chain shoe stores. Clerks were instructed to record size, width, and stock number of each pair of shoes sold – after recording the usual price and clerk number. A sales slip was also written for each sale or the printed shoe ticket was retained for comparison with the register tape at the completion of the study. With no further instructions or supervision, over 50,000 transactions were recorded in this manner and the results proved 98.4% accurate."

IBM's Retail IMPACT and NCR's REACT are important to the United States shoe-manufacturing industry because (1) they are directly applicable to the retail segments of integrated shoe companies; (2) as more and more retailers use computer programs such as IMPACT and REACT, retailers' need for source marking by manufacturers increases, and the availability of point-of-sale data needed by both manufacturers and retailers increases; and (3) similar programs can be developed for shoe manufacturers.

*Optical font tape is paper tape with characters printed in a specific style that can be read by an optical scanning device.
**National Association of Shoe Chain Stores is now the Volume Footwear Retailers Association.

The New York Times[31], in a report on the new IBM and NCR computer-based inventory-control systems, stated that "'Out of stock' and other equally painful terms may be practically stricken from the retail lexicon, in the not too distant future" because of the computer. The article describes the pressure on retailers to automate their inventory operations:

> "A survey by Touche, Ross, Bailey, and Smart found that advanced inventory management systems increased sales by 16 percent and decreased out-of-stock items by 52 percent. They also were found to reduce stock shortages, markdowns, and inventory investment while increasing stock turnover and gross margin on products. There are indications that retailers may have very little choice about automating their inventory operations. It will be a case of automate or go out of business, according to some industry observers. One of the trends forcing automation has been the proliferation of branch stores. The more branches a store has, the harder it is to control operations, and a little loss of control here and there has in the past often resulted in bankruptcy. The sharp increase in the number of items now carried also is a major problem that only the computer seems to be able to handle."

A definite acceleration of EDP implementation by shoe retailers appears to exist. With a larger number of shoe retailers using EDP, shoe manufacturers will have an increasing opportunity to obtain current point-of-sale data on their products through data-sharing agreements with retailers, thereby improving the information on which their production and inventory decisions are based.

OPPORTUNITIES FOR INVENTORY IMPROVEMENTS IN THE SHOE INDUSTRY

Major advances have been achieved in scientific inventory control in recent years, permitting the many factors that influence inventory policy to be related mathematically to reduce the relevant inventory costs.

The rapid development of electronic data-processing (EDP) systems in the last 15 years has provided important opportunities for improved solution of management problems, including the determination of inventory policy, because of the computer's speed, memory, and programming capabilities. These two developments provide relatively new opportunities for companies to increase profits through inventory management.

Opportunities also exist for shoe manufacturers to improve inventory management through data sharing and stock-replenishment agreements with retailers.

Scientific Inventory Control

The ability to analytically determine order quantities and order points by use of mathematical models that relate all significant cost and sales factors provides management with a powerful tool for cost reduction and improved customer service. All too often, the decisions of how much and when to buy or produce are made from the standpoint of one department's interests rather than from the overall standpoint of the

company. The use of mathematical models makes it possible to describe and relate the many factors in a company that are involved in the inventory problem in a manner and with a precision that are not possible by verbal description, thereby permitting improved customer service at lower total cost.

Annual inventory costs for any item carried in stock can usually be related to the order quantity by a curve of the general shape shown in Figure 4. The optimum order quantity "Q" is determined by the lowest point of the curve, at which annual inventory costs "C" are a minimum, as indicated by the dotted lines in Figure 4.

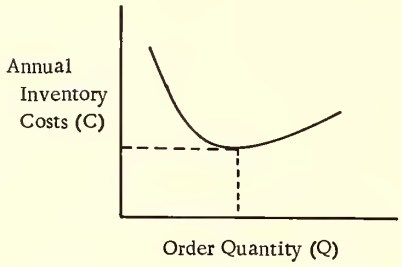


FIGURE 4. INVENTORY COSTS VERSUS ORDER QUANTITY

A mathematical inventory model permits determination of the order quantity and reorder point that theoretically minimize costs. If thousands of items are stocked, the optimum order quantity Q may be different for each item. Item-by-item control based on individually determined order quantities and order points can often effect substantial cost savings. If stockout limits are included in the inventory models, any desired level of customer in-stock service can be provided, or different levels of service can be tested by the models to determine the costs of improving customer service by a specified amount.

A simple but effective approach in initiating an inventory-control system is to classify or list all items according to dollar value sold or used on a periodic basis, such as annually. Such lists are often called "distribution by value" or "ABC classification" lists. The higher (more important) items on such a list should be treated with higher priority in determining order quantities and order points. Items at the end of the list may involve such insignificant costs that elaborate mathematical models and EDP are not warranted for their inventory control.

Because of the extensive calculations that must be made, it becomes difficult if not impossible to apply scientific inventory control to a large inventory without the speed and data-handling power of a computer. Many of the current generation of high-speed, internally programmed digital computers are capable of performing a large portion of a corporation's routine clerical tasks, providing programmed decision making for repetitive operations and serving as powerful experimental tools for testing new management policies. EDP in no way replaces management skills, but rather permits the astute manager to multiply his effectiveness by providing more data, more time for decision making, and more alternative courses of action than were possible prior to the advent of the digital computer.

On the other hand, it is often possible for companies with a small number of major cost items in inventory to reduce inventory costs by scientific inventory control without the use of a computer.

Production Scheduling and Smoothing

A fluctuating production schedule is costly because of overtime or hiring costs during periods of high production, and costs of personnel and machine idleness or release during periods of low production. A smooth production schedule for items with fluctuating demand may cause large and costly inventories during low-demand periods and severe shortages in periods of high demand. Thus, the manufacturer has a problem of selecting a production schedule that will minimize the sum of the costs of (a) production fluctuations and (b) holding inventory. Mathematical techniques, such as linear programming and dynamic programming, can be applied to combined production scheduling and inventory-control problems. If the two related production and inventory problems are not treated in combination by a mathematical model, then the effects of different production schedules on inventory costs can be evaluated by mathematical inventory models. By either approach, the production schedule and inventory policy can be established by considering the interaction between the two.

Marketing Applications

Through scientific inventory control and EDP, shoe manufacturers can take effective action to eliminate slow-selling styles from the product line, produce additional quantities of profitable styles before the end of a season, transfer items between warehouses to meet regional demands, rate retailer performance, and establish style trends. These applications depend upon the manufacturer's obtaining timely and accurate data on retail sales.

It is important to realize that EDP and scientific inventory management offer opportunities to improve customer service – the ability of a manufacturer to have the right shoe, in the right style, color, size, and width at the right store at the right time – as well as opportunities to reduce costs.

Data Sharing and Integrated Inventory Management

A potential exists for cooperative data sharing and integrated inventory management by shoe manufacturers and retailers. Manufacturers need an "early warning system", and retailers can benefit from automatic reordering systems. Timely retail-sales data in stock-keeping-unit (SKU) detail are needed by manufacturers with in-stock policies, to detect sales trends for new styles and to predict consumer demand for all items so that production planning and scheduling can be adjusted to maintain inventory levels consistent with retail sales. On the other hand, retailers can profit greatly from an automatic reordering system based on predetermined decision rules agreed to with the manufacturer. A system that keeps the retailer in stock with items customers want is needed by both retailers and manufacturers to reduce lost sales due to walkouts. Capture of SKU data at the point of sale and the sharing of such data by retailer and manufacturer can provide both with substantial inventory savings and profit improvement.

Such cooperative data-sharing agreements have worked successfully in the women's intimate apparel field. Approximately 40 manufacturers of women's intimate apparel, accounting for about 90 percent of the industry's production, are now source marking merchandise with print-punch tags. However, many problems would have to be overcome to permit such data sharing in the shoe industry. Among these are the difficulty of (1) establishing a meaningful coding language and format for marking and identifying shoe styles, colors, finishes, and materials, and (2) obtaining agreement of a large number of manufacturers and retailers on the coding language, as well as the concept of data sharing. The natural reluctance to divulge data that might be useful to a competitor is a major obstacle.

The need for feedback of point-of-sale data from retailer to manufacturer was expressed recently by Mr. W. F. Barber, Jr., Executive Vice-President, Brown Shoe Company, in a presentation to the American Marketing Association.[32] Mr. Barber noted that:

> "Most manufacturers do not receive enough of the right kind of point-of-sale information often enough – information which we require to better fit our product and our services to retail needs.
>
> "From a product standpoint, information should embrace sales activity and fashion correctness. A sales trend, up or down, will determine how we support the item in stock. An early tip on big action may permit us to do a better job of covering future retail needs from stock. On style, is it fashion right now? Is it on trend? Is it right enough to justify expanding into additional companion types? Is it right enough to warrant more promotion? Is it in a classification that is decreasing in importance?"

Analysis of accurate and timely sales data will permit a manufacturer to detect trends and to adjust production schedules and inventory levels accordingly.* Lost sales due to stockouts resulting from underproduction, and markdowns of leftovers at the end of a season resulting from overproduction, can both be significantly reduced. Effective use of scientific inventory control requires accurate and timely sales data for demand forecasts.**

The value attached to obtaining point-of-sale data by several British shoe manufacturers is demonstrated by the retail audit of shoe stores performed by Stats (MR) Ltd., a leading market research organization, for four British shoe manufacturers including Norvic Shoe Company Limited. The retail audit involves monthly physical inventory counts in a representative sample of shoe stores and extrapolation of the results to give an estimate of sales patterns for the entire market. Norvic explains the benefits of the retail audit as follows[34]:

> "The retail audit type of research is the biggest development in the footwear industry for many years. It is essential to the most profitable use of modern mass-production techniques of the kind we have applied in our factories. For the first time we have an accurate 'moving picture' of what is actually happening in the shoe shops. We can see how many purchases people are making; which types of shoe they prefer; which price tickets are the best

*In the food industry, the demand by manufacturers for data on merchandise movement has recently led to a new business – the purchase of data (on merchandise movement between warehouse and store) from food chains and wholesalers with electronic data-processing equipment, and resale of the data to manufacturers.[33]

**See Appendix C for a discussion of forecasting for inventory control.

sellers; whether a particular fashion is catching on; which shoes are moving quickest from the shelf. Decisions about production planning, the creation of new ranges and the direction of sales campaigns can be made more confidently, because they will be based on sound and reliable information."

Although the British retail audit of shoe stores provides accurate point-of-sale data from representative stores, the data are not absolutely current when received, since the audit is conducted on a monthly basis.

For point-of-sale data to be of maximum value to a manufacturer, it should be both accurate and timely. Methods are now available for feedback of such data from retailers to manufacturers, and several shoe manufacturers are already capitalizing on the opportunity thus provided for improved inventory control.

It is therefore recommended that individual manufacturer-retailer teams investigate this area.

Data Collection at Point of Sale

Until recent years, retail stores of various types typically counted stocks of staple merchandise at 2-, 3-, or 4-week intervals to determine what had been sold and what should be reordered. A different approach was often used for fashion or style goods: sales were counted by ticket removal, sales checks, or similar means. However, for several years a trend has existed in staple goods toward the capturing of sales information at the point of sale, instead of counting stock.

Several factors have led to this trend. The rise in personal incomes and standard of living in this country have resulted in consumer demands for an increasing variety in merchandise. The resultant proliferation of the number of stock-keeping units required by retailers has made it necessary for retailers to carry more varied and consequently larger inventories to satisfy consumer demand. Thus, the job of physically counting stocks has grown more time-consuming while the cost of labor has been rising. Since inventories cannot be carried in great depth with the wider variety of merchandise now required, the need for timely sales and inventory data is more critical.

A wasteful duplication of effort also occurs when stocks are manually counted frequently to determine quantities to reorder. As an example, if stocks were counted every 2 weeks, and if merchandise turnover were three times per year, then, on an average, an item would be counted about 8-1/2 times before it is sold. If merchandise data are captured at the time of sale, physical-inventory counts are required only infrequently to verify inventory records.

It has also become very expensive for retailers to manually count sales by use of price tickets, sales checks, or similar means, and to post the information, analyze it, and write purchase orders for today's larger assortments of merchandise. Thus, a further trend exists today toward retail-sales-source-data automation, or the counting and processing of sales data automatically instead of manually. A number of techniques and devices are currently available for capturing point-of-sale data in a machine-readable form, including the following:

(1) Print-punch tickets or tags
(2) Punched cards
(3) Mark-sense cards
(4) Cash registers with punched paper tape or optical font tape
(5) Key entry devices (other than cash registers)
(6) Handwritten sales checks for optical scanning systems.

All of the above methods of capturing data, except Item 6, may be described as one of two basic methods — "seeding" and key entry. The tickets, tags, or cards must be "seeded", or placed on or with the merchandise either by the manufacturer or by the retailer for later removal at the point of sale. The key entry method, as well as the handwritten sales check, depends on identification data being marked or affixed in some manner to the merchandise so that it can be read by a salesperson or cashier at the point of sale.

It is recommended that an industry-wide study be initiated to determine the best point-of-sale data-collection method for the shoe industry.

Data Marking

For any method of capturing point-of-sale data, a requirement exists for prior marking or affixing data to the merchandise by either the manufacturer or the retailer. This is necessary to ensure accuracy of the captured sales data.

The National Retail Merchants Association (NRMA) Electronics Committee held a series of meetings with representatives of shoe manufacturers and retailers during the period 1961 to 1964 to discuss EDP applications of mutual interest, and a Shoe Pre-Marking Subcommittee of NRMA was formed in 1962. About ten shoe manufacturers and the National Footwear Manufacturers Association were represented at joint meetings with NRMA. Retailers were generally quite anxious to achieve agreement on a source-markin system for shoes, but manufacturers generally had reasons why it could not be done. Cost of marking and difficulty of reaching agreement on a coding language were the reasons generally given by manufacturers for not source marking. All of the NRMA-shoe industry joint-committee work was disbanded in 1964.

In the case of print-punch tags, it has been estimated by NRMA that the cost of punching and affixing the tags to shoes is about 3 cents per dozen pairs if done by a manufacturer as part of the production process, versus about 96 cents per dozen pairs if done by a retailer upon receipt of the shoes. Based on this estimate, the cost of marking shoes with print-punch tags is only 3 to 4 percent as great for a manufacturer as for a retailer. An exception probably exists in the case of large-volume retailers such as mail-order companies, where it may be economical for the retailer to print and punch the tags and have the manufacturer affix the tags to the shoes.

A new machine for automatically attaching print-punch tags to a pair of shoes within 6 seconds by a tying operation has been introduced by United Shoe Machinery Corporation.[35] This machine has been recommended for operations where 500 or more pairs of shoes must be tied and tagged daily. When retailers print-punch and affix tags after receipt of merchandise, the operation normally requires about 3 days, thus delaying the availability of the goods for sale.

It would appear that other methods of marking shoes with the necessary data are also significantly less expensive for the manufacturer than the retailer when done as part of the production process. Thus, data marking is a service to retailers that can be offered by manufacturers on a relatively low-cost basis while providing an opportunity for obtaining feedback of point-of-sale data.

Data Coding

It is generally agreed that source marking of merchandise by manufacturers is impractical without a common format and coding language. A common marking code language has been developed by the women's intimate-apparel industry.

The required data for shoe marking would probably include, as a minimum, numbers for manufacturer, shoe category, classification, type, size, width, material, color, and finish. Price-range information would be optional. The Data Universal Numbering System (D-U-N-S) developed for account identification by Dun and Bradstreet, Inc., provides a ready-made code for manufacturer identification. Over 450,000 companies have been assigned D-U-N-S numbers. Some progress in developing a standard coding language for shoe marking has been made by the Shoe Pre-Marking Subcommittee of the National Retail Merchants Association working with shoe-manufacturer representatives from 1962 to 1964, and by Kimball Systems Division of Litton Industries, Inc., largest manufacturer of print-punch tags and related equipment. However, further work is required to develop the coding system and to obtain manufacturer and retailer agreement on its use. An industry-wide program should be initiated to develop a best industry-wide data-coding system.

Data Feedback from Retailer

Feedback of point-of-sale data from retailer to manufacturer may be accomplished by a number of methods. At one extreme, the United States mail may be used to return tags, cards, cash register tapes, or sales checks to manufacturers. At the other extreme, computer-to-computer data-transmission systems using telephone or telegraph lines may be used.

Advantages to the manufacturer of obtaining data feedback from retailers include early detection of sales trends, permitting improved production scheduling and inventory control, reduced manufacturer markdowns, and improved customer delivery service.

Some type of information security would be desired to prevent use of retailers' and manufacturers' data by competitors, but such problems should be surmountable.

Automatic Replenishment of Retailer Stock

Agreements for automatic replenishment of retailer stock offer advantages to both the manufacturer and retailer. Advantages to the retailer are:

(1) Improved in-stock service to consumers and fewer walkouts

(2) Fewer markdowns because of improved trend detection and inventory control

(3) Savings of time and labor now spent on review of inventory position, analysis of sales and inventory data, order decisions, and processing of orders.

Advantages to the manufacturer are:

(1) Fewer lost sales through improved retailer in-stock service of manufacturer brands

(2) Improved knowledge of retailer purchase plans for manufacturer brands.

Data-Sharing Arrangements

A number of possible manufacturer-retailer arrangements for data-sharing exist. Some possible arrangements based on the four combinations of manufacturers and retailers with and without EDP systems are suggested in the following list:

(1) Manufacturer with EDP and retailer with EDP

(a) Manufacturer provides source-marking service

(b) Retailer captures point-of-sale data by any means

(c) Manufacturer or retailer performs EDP operations for automatic stock replenishing

(d) Data is fed back to manufacturer in source document form or in magnetic tape or other computer-input form as agreed

(2) Manufacturer with EDP and retailer without EDP

(a) Manufacturer provides source-marking service with punched tags or cards

(b) Retailer captures point-of-sale data, sorts punched tags or cards (manually or by machine), and mails to appropriate manufacturers

(c) Manufacturer performs EDP operations for automatic stock replenishing

(d) Manufacturer provides retailer with retailer sales and inventory reports

(3) Manufacturer without EDP and retailer with EDP

(a) Manufacturer provides source-marking service where desired

(b) Retailer captures point-of-sale data by any means

(c) Retailer performs EDP operations for automatic stock replenishing

(d) Retailer provides manufacturer with computer-produced sales reports on manufacturer's products

(4) Manufacturer without EDP and retailer without EDP

(a) Manufacturer provides source-marking service with punched tags or cards

(b) Retailer captures point-of sale data, sorts punched tags or cards (manually or by machine), according to manufacturer.

(c) Manufacturer and retailer jointly pay computer-service-bureau cost for computer produced, automatic stock-replenishment orders.

(d) Manufacturer pays service bureau costs for computer-produced sales reports of manufacturer's products.

The data-sharing arrangements listed above are only suggestive of the many possibilities. The problem of establishing equitable shares of EDP processing costs for manufacturer and retailer would require considerable study and negotiations between the parties. The benefits of data sharing to manufacturers and retailers warrant the effort and expense that will undoubtedly be required to meet the challenges of the many problems to be solved in implementing such programs.

CONCLUSIONS AND RECOMMENDATIONS

On the basis of the opportunities for profit improvement through inventory management that exist in the United States shoe industry, the following measures are recommended:

Recommendation 1

Individual shoe manufacturers should investigate scientific inventory-control and EDP systems and introduce them where economically justified.

The shoe and leather industry has the third highest ratio of inventories to gross profits (5.2 to 1) of any industry in the United States, based on 1961-62 data.[3] At least 20 shoe manufacturers are now using EDP for inventory-control applications, but very few are using scientific inventory control. However, several integrated companies in the United States shoe industry, in various stages of implementing computer-based inventory control systems, have achieved or anticipate inventory reductions in the range of 20 percent to 40 percent. In implementing scientific inventory control it is common that a net inventory reduction and improved customer service are achieved, although inventories of selected items are often increased in order to balance stocks and meet service goals. It is clear that a potential exists for a large number of shoe manufacturers to improve their profit position through scientific inventory control. In many cases, EDP equipment may be required to obtain the benefits of scientific inventory control, although in smaller companies significant reductions in inventory costs can often be achieved by manual systems. Smaller companies that cannot justify the acquisition of computer facilities can utilize service bureaus or business-information utilities when computers are required.

The current rapid development of computer capacity, speed, and time-sharing capabilities, coupled with decreasing costs, is making the use of EDP systems profitable to small manufacturers that could not consider such possibilities only a few years ago.

Any individual manufacturer must, of course, evaluate the many factors peculiar to his own business before embarking on a new inventory-management system. The capital equipment and other expenditures for EDP must be justified by the benefits to be gained in all phases of a company's operations and not just by the reduced inventory carrying costs alone. However, it is extremely important to consider the benefits to be gained from the use of a computer as an aid to management decision making, in addition to its use in replacement of clerical labor. Only when a computer is used in the analysis of complex management problems can it provide maximum payoff.

It is generally necessary for a company to perform a substantial amount of "systems" work in preparing for a computer installation, and this period of preparation may take several years. A specialized staff or the services of a consulting firm will generally be required to perform the necessary systems-analysis work. The major phases involved in planning, installing, and implementing an EDP-based scientific inventory-control system are listed in Table 1 as the key steps for Recommendation 1.

Many of the smaller shoe manufacturers, especially unbranded-shoe manufacturers, cannot justify use of EDP today. But even if a company cannot currently justify installing EDP, it should anticipate needs several years in advance, when the opportunities will be greater and the costs lower, and initiate the planning for a computer installation early enough so that the necessary groundwork will be accomplished by the time the need exists. Smaller companies that cannot justify use of EDP should still investigate the use of scientific inventory control as a means of achieving important objectives of lower costs and improved customer service.

Recommendation 2

> Individual shoe manufacturers and retailers should investigate and implement agreements for manufacturer-retailer data sharing and automatic replenishment of retailer stock. Methods are available for individual manufacturers and retailers to accomplish this step, but an industry-wide study should be made of the problems involved, the data requirements, and the appropriate methods of implementing this step. Such a study would be of value to individual companies, and it would eliminate considerable duplication of effort.

The data-sharing step basically requires data marking by manufacturers; data collection at the point of sale by the retailer; feedback of the data to the manufacturer; and processing the data by the manufacturer, retailer, or a service bureau. Key steps regarding these factors are covered in other recommendations below. Feedback of timely and accurate data on retail sales would provide the shoe manufacturer with much valuable information. It would enable the manufacturer to greatly improve forecasts of sales trends for different styles, regions, and price ranges. It would permit improved production planning and scheduling, with reductions of costly production fluctuations. Marketing plans for introduction of new styles could be made with far more confidence and less risk.

Automatic replenishment of retailer stocks would require the feedback of retail-sales data to the manufacturer. It would be based on reorder rules previously agreed to by manufacturer and retailer. For both branded and unbranded manufacturers, it should result in fewer lost sales due to retail stockouts and in improved forecasts of sales. For the retailer, automatic stock replenishment should improve customer service, reduce walkouts, reduce markdown losses, and reduce labor costs for inventory review and ordering.

Recommendation 3

A universal coding language for marking, capturing, and processing stock-keeping-unit data should be developed by representatives of shoe manufacturers and retailers on an industry-wide basis.

This step is necessary to permit manufacturers and retailers to achieve full benefits from data sharing and EDP. Without a common coding language, efficient computer programs could not be written to accommodate input data from various sources. Industry-wide cooperation of shoe manufacturers and retailers will be required to develop and reach agreement on a coding language. Associations such as the National Footwear Manufacturers Association, New England Shoe and Leather Association, National Shoe Retailers Association, Volume Footwear Retailers Association, and National Retail Merchants Association, could perform valuable coordinative functions in developing a coding language.

Recommendation 4

Individual shoe manufacturers, with cooperation from their retailers, should investigate and implement the best available methods of source marking shoes with stock-keeping-unit data where required by data-sharing agreements. An industry-wide study is also recommended to reduce costly duplication of effort and to lead to improved and standardized marking methods.

It is generally less expensive for the manufacturer to mark shoes than it is for the retailer; furthermore, if retail-sales data are fed back to the manufacturer, it is in his interest to mark the shoes to ensure that feedback data are in the desired format.

Recommendation 5

Individual retailers, in cooperation with manufacturers, should investigate and implement methods of capturing stock-keeping-unit data at the point of sale to the consumer and feeding the data back to the manufacturer. Again, an industry-wide study is recommended to reduce costly duplication of effort and to provide standardized methods.

A number of methods of capturing data at the point of sale exist, including various types of tags, cards, cash registers, and sales checks, as previously discussed. But the best method for one retailer may not be best for another. The retailer's choice should consider manufacturers' requirements for data feedback. An industry-wide study is needed to provide guidelines and basic information about various methods of capturing data and their applicability to different types of retailers. The manufacturers' data requirements should be recognized in the results of the industry-wide study.

Recommendations 3, 4, and 5 are necessary for full and effective implementation of Recommendation 2.

Recommendation 6

> A feasibility study should be conducted to determine whether a research program to investigate the cyclic behavior of key variables in the United States shoe industry (e.g., retail sales; retailers' orders; manufacturers' shipments, production, inventories, and leather orders; and prices of leather and hides) would be worthwhile. It is likely that such a study would lead to important reductions in costs caused by shoe business cycles.

Such a research program might give insights into the cause-and-effect relationships among the key shoe industry variables which could, in turn, lead to industry-wide measures to control specific variables to produce an improved operating environment for the industry. No guarantee could be made for the results of such a research program, but it might result in quantitative predictions such as (1) the effects on industry sales of changing the timing of seasonal advertising campaigns, (2) the effects on leather prices of increased use of synthetic materials for shoe uppers, and (3) the effects on manufacturers' production fluctuations, if timely and accurate feedback of retail sales data were obtained.

These recommendations are summarized in chart form in Table 5, together with suggested key steps necessary for implementation.

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TABLE 5. RECOMMENDATIONS AND SUGGESTED KEY STEPS

Recommendations	To Be Carried Out By	Suggested Key Steps
.. Investigate scientific inventory control and EDP systems and introduce them where economically justified	Individual shoe manufacturers	A. Conduct feasibility study (make preliminary assessment of payoff) B. Perform systems analysis by specialized staff or consulting firm (Determine required computer program, data requirements, and report formats; develop mathematical inventory models) C. Install EDP equipment D. Convert from manual to EDP systems E. Use EDP for routine clerical tasks F. Use EDP for business-problem analysis and decision making, plus E G. Use EDP for simulation and testing management programs, plus E and F
2(a). Investigate and implement manufacturer-retailer agreements for data sharing and automatic replenishment of retailer stock 4(a). Investigate and implement best available methods of source marking shoes with stock-keeping-unit data 5(a). Investigate and implement methods of capturing stock-keeping-unit data at the point of sale to the consumer and transmitting the data back to the manufacturer	Individual shoe manufacturers and retailers	A. Shoe manufacturer obtains agreement from selected retailers to work on program B. Hold meeting of manufacturer and retailers to establish data requirements and initiate study of methods for marking, capturing, and transmitting data C. Systems analyst develops mathematical models for use in determining reorder quantities for each retailer D. Conduct engineering study of methods for marking, capturing, and transmitting data E. Manufacturers and retailers negotiate data-sharing and automatic-reordering agreement
2(b). Conduct an industry-wide study of problems, data requirements, and methods of implementing manufacturer-retailer agreements for data sharing and automatic replenishment of retailer stock 3. Develop a universal coding language for marking, capturing, and processing stock-keeping-unit data 4(b). Conduct an industry-wide study of best available methods of source marking shoes with stock-keeping-unit data 5(b). Conduct an industry-wide study of best available methods of capturing stock-keeping-unit data at the point of sale to the consumer and transmitting the data back to the manufacturer	Industry committee, assisted by a consulting firm	A. Form industry committee for manufacturer-retailer data sharing, perhaps at joint instigation of National Footwear Manufacturers Association and New England Shoe and Leather Association B. Hold meeting of committee, composed of representatives of manufacturers, retailers, and associations to plan program C. Retain consultant to perform study D. Have consultant develop recommendations of detailed approaches for different sizes and types of manufacturers and retailers E. Hold committee meetings periodically to review and guide consultant's work and to publish information and recommendations for entire shoe industry
6. Determine by means of a feasibility study whether a research program to investigate the cyclic behavior of key variables in the United States shoe industry would be worthwhile	Consulting firm or research organization	A. NFMA and NESLA prepare draft scope-of-work statement for use in request for bid B. NFMA and NESLA request members' approval of scope-of-work statement and indication of willingness to support study C. Send requests for bid to qualified organizations D. Receive bids and select contractor E. Issue contract

APPENDIX A

SCIENTIFIC INVENTORY CONTROL

Phrased in the simplest terms, inventory control consists of determining when and how much to order for every item purchased or manufactured by a company. The illusion of simplicity is soon shattered if one examines the many factors involved in making such decisions. It is the purpose of this Appendix to examine some of these factors and to indicate how they may be accounted for in scientific inventory control.

The Nature of Inventory Problems

Let us first consider basic raw materials such as leathers, rubber, synthetic materials, threads, cement, linings, dyes, ornaments, etc., and what influences the decisions of when and how much stock to order. When to order is certainly influenced by existing stock levels. If one hopes to maintain continuous production, he must have a continuous supply of raw material. This requires only that replenishments arrive by the time existing stock levels reach zero. A snap judgment at this point might lead to a policy of ordering when stock is exhausted. This is generally unsatisfactory since very few suppliers will provide zero lead time. Lead time then becomes another factor to consider in the determination of when to order. Lead time may vary among suppliers so that we must also consider which suppliers or combination of suppliers we will patronize. Closely related to the lead time and present inventory level of an item is the rate at which this inventory is being depleted. This depletion rate is a function of current production schedules, which are in turn functions of forecasted future demand and existing orders. Since there is probably a cost associated with being unable to supply customer demands, a cost of shortage must also be considered. Obviously, the question of when to order can be rather formidable. Let us now turn our attention to the question of how much to order.

How much to order is intimately related to all of the factors previously mentioned, plus a number of purely economic considerations. To begin with, placing an order costs money. This cost is made up of accounting and handling charges such as paper-work expenses, shipping charges, materials-handling charges, and data-processing charges. When the item is manufactured in-plant, the order cost would include machine setup charges. The obvious solution to reduce unit order cost is to order in very large quantities. This may be an expensive solution if one considers charges such as the cost of capital invested in idle inventories, the cost of providing warehouse space for such inventories and property taxes. The price paid for the stock also influences the decision of how much to order. Price breaks may be available for large-quantity purchases. Different suppliers may have different price schedules. The amount of capital available may be limited. Many of the carrying charges are proportional to the price of the item.

Successful inventory management for just one item involves an extensive list of considerations only hinted at in the previous paragraphs. If the organization exists for economic purposes, it is the goal of the inventory manager to make the decisions of when and how much to order in such a manner that costs are minimized, while at the same time balancing many intangible factors for which dollar figures cannot be obtained.

The interaction among the many raw-material items stocked must also be considered. For example, all items compete for space and dollars, they all have unique price, lead time, and demand characteristics, and they all are available in a variety of forms. A question might be raised concerning the form in which to stock items. Should they all be stocked as raw material or should in-process banks and finished goods inventories be established? If so, in what proportions?

A similar set of problems could be posed for routine office-supply items, janitorial supplies, and maintenance items. Multiply these considerations several thousand times and one can begin to appreciate the magnitude of the problem facing the managements of large corporations when they attempt to answer the questions of when and how much to order. Figure A-1 depicts the many considerations that must be taken into account in inventory management.

The Role of Inventories

If controlling inventories is such a complicated business, why bother to keep them? In some custom industries no inventory may be a plausible solution, particularly for finished-goods inventories. For example, a home-building contractor may never reach the point where he stocks finished homes, but rather he builds strictly to customer order. His product is characterized by high unit costs, considerable variation among units, relatively low demand, and reasonably patient customers. However, even a building contractor may sometimes find it to his advantage to stock raw materials that are common to all homes.

There are several reasons why companies, such as shoe manufacturers, involved in more or less continuous purchase, production, and sale of a reasonably standard product, must maintain inventories. In a general sense, they may be viewed as buffers between subsystems that permit goods to be made available when they are required, in spite of lead times and fluctuations in demand. For example, raw-material inventories serve as a buffer between suppliers and the manufacturer. Fluctuations in stock delivery time, breakdowns in supplier operations and price variations can be smoothed by the inventory buffer before they can cause undesirable fluctuations in a plant's ability to produce. In-process inventories provide a similar function for fluctuations between stages of the production process by reducing the dependence between stages. Finished-goods inventories provide the buffer between the producer and the customer. Variations in daily demand can be absorbed by the inventories without causing customer dissatisfaction and without introducing undesirable fluctuations in production schedules. The buffer function of inventories is essentially that of smoothing operations.

In addition to the desirable buffering properties of inventories, which permit customer demand and production schedules to be met, inventories perform other important functions. Inventories often permit economies to be realized through quantity discounts, large production runs, or purchase of goods at low prices. In the shoe industry, leather is often bought by manufacturers in large quantities and then held in inventory as a protection against price increases. In the retail trade, a portion of inventory is often held to promote sales through merchandise displays.

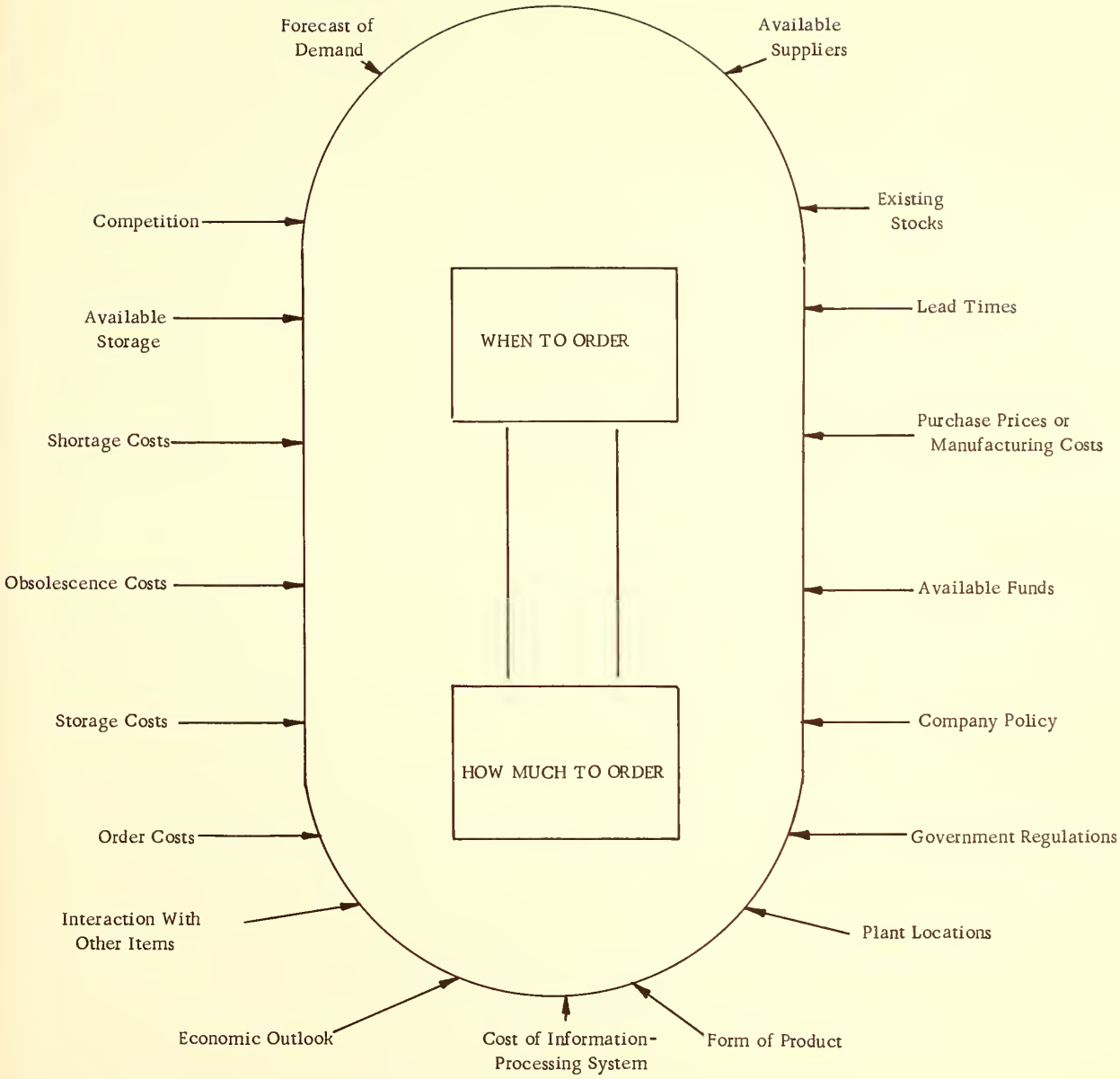

FIGURE A-1. THE INVENTORY PROBLEM

Criteria for Selecting Inventory Policies

The objective in establishing inventory policy is generally to make profits as high as possible. This is usually equivalent to making the costs relevant to inventory policy as low as possible. In scientific inventory control, mathematical analysis is used to relate, in terms of an appropriate criterion, the many factors that are relevant to inventory policy. The criterion in selecting inventory policy is generally maximum expected profit or minimum expected cost for a specific time period, such as 1 year. An alternative method would be to attempt to maximize the present worth of expected future profits or minimize the present worth of expected future costs. However, for interest rates and time periods between orders that are of practical interest, the two methods give almost identical results. The method based on optimization of expected profits or costs for a specific time period is generally used because it is more convenient.

One complication that often arises in selecting an inventory policy is that the cost of stockouts, which may include loss of customer goodwill, is difficult to determine. One approach to this problem is for management to set a constraint, or limitation, on (1) the average number of stockouts over a specific period of time or (2) the fraction of time during which the inventory system may be out of stock. The goal is then to maximize expected profits or minimize expected costs subject to the constraint. If demand rate and lead time exhibit significant statistical fluctuations, then imposing a requirement that no stockouts are to be permitted will often cause the inventory costs to be prohibitive.

The selection of inventory policies by mathematical analysis requires the construction of "mathematical models" or expressions that relate the relevant factors. Inevitably, this involves assumptions and simplifications about the physical inventory system. Thus, the maximization of expected profits or minimization of expected costs by mathematical analysis cannot be expected to truly optimize the physical-inventory system; however, it can generally produce policies that are significantly better than those that could be established by other methods. In some cases, the physical-inventory system involves so many complicating factors that mathematical models cannot be devised to adequately represent the actual situation. The best that can be done in such cases is to simulate a number of different inventory policies by use of a computer and to select the one that appears to be best. The simulation approach is discussed later in this Appendix.

Types of Mathematical Inventory Models

Attempts to provide quantitative assistance to inventory managers date back to the early 1900s, but it has been only in recent years that mathematical methods of inventory control have gained wide acceptance. A remarkably rapid development in scientific inventory control has taken place since World War II. Considerable impetus has come from the Operations Research Society of America, the Institute of Management Sciences, and the American Institute of Industrial Engineers, which have provided journals for publication and a forum for presentation of papers related to scientific approaches to operational problems in business and government. The rapid development of electronic data-processing systems during the last 15 years has further stimulated interest in mathematical analysis of inventory systems. The solution speed and data-handling capabilities

provided by the computer make feasible many mathematical approaches that would otherwise not be practical.

The successful application of mathematical techniques depends upon the ability of the scientist to construct realistic models and upon the ability of the manager to understand their power and limitations. Both abilities are of fairly recent origin. The aim of all inventory models is to extend decision-making abilities just a little further by providing mathematical insights into the behavior of relatively simple systems. Such quantitative tools serve to strengthen rather than replace the traditional skills of management. Inventory models for individual items can be divided into two basic mathematical types, which are called deterministic* and probabilistic.** Within these types, the models can be steady-state or dynamic, as explained later.

The simplest types of mathematical inventory models are deterministic models in which demand rate, lead time, and other factors are assumed to be known with certainty and to be constant over time. The commonly used economic order quantity (EOQ) formula

$$Q = \sqrt{\frac{2DA}{IC}} \quad ,$$

where

Q = economic order quantity

D = demand rate in units per time period

A = ordering cost per order

I = inventory carrying cost in dollars per time period for each dollar of average inventory

C = unit cost of item,

is obtained from a simple deterministic model based on assumptions of (1) known constant demand rate and lead time, (2) no stockouts, (3) a unit cost independent of quantity ordered, and (4) instantaneous delivery of the entire quantity ordered after expiration of the lead time. In order to add realism and accuracy of results to inventory models, it is generally necessary to make fewer simplifying assumptions, thereby increasing the complexity of the models. However, even this simple EOQ formula permits some logical rules to be established for inventory policy that are often violated in actual inventory systems. First, the economic order quantity is proportional to the square root of demand rate D, assuming all other factors are equal, and inversely proportional to the square root of unit cost C. Therefore, decision rules for ordering quantities of all items in an inventory system at a given time to provide for expected sales for a fixed period of time are not valid. That is, items with different demands and different unit costs require different treatment. For example, if item X has a demand four times as great as item W, then only twice as many of item X should be ordered at a time, not

*A "deterministic model" is a mathematical relationship in which all independent variables are assumed to be known with certainty.

**A "probabilistic model" is a mathematical relationship in which some or all independent variables are assumed to obey certain laws of probability (to be statistical in nature).

four times as many, assuming that all other factors are equal. If it is assumed that item Z has a unit cost four times as great as item Y, it would be appropriate to order half as many of item Z at a time as item Y. Many inventory systems in operation today do not consider these two rules.

Uncertainties of demand rate and lead time are taken into account in probabilistic steady-state models by use of statistical methods and probability concepts. Results obtained from such models are much more realistic and useful for most practical inventory problems than those obtained from deterministic models. Probabilistic steady-state inventory models are based on an assumption of steady-state conditions; that is, constant average demand rate and lead time about which statistical fluctuations occur. This assumption is often justified, especially if the changes in average demand rate or lead time occur slowly enough so that during the time intervals between updating of the averages used in the calculations, the system can be treated as though it were in a steady-state mode of operation.

Dynamic inventory models take into account the longer-term variations in the averages of demand rate and lead time. If they are probabilistic models as well, they also take into account the short-term statistical fluctuations in these factors. The difficulty of formulating and solving the dynamic mathematical models is considerably greater than for the other types discussed. Thus, in constructing mathematical inventory models, realism is achieved at the price of difficulty and complexity. A large digital computer is generally required for solutions to dynamic inventory models of practical interest, whereas solutions to deterministic and probabilistic steady-state models for single items can readily be obtained manually. However, it is often desirable to use a computer even for solutions to these two simpler model types because of its speed, large data-handling capacity, and the volume of data to be processed. When thousands of items are being stocked and have frequent transactions, manual calculations to determine when and how much to order soon become prohibitive in cost and time requirements.

In addition to the classification of inventory models by mathematical type, they might also be grouped according to the ordering rules of the inventory system. Three basic types exist here – lot-size reorder point, periodic review, and single-period models. Many variations exist for each type.

A lot size-reorder point model is one that determines a fixed quantity, or lot size, to be ordered whenever the inventory for an item falls to a predetermined level called the reorder point. When this type of model is used, the inventory system must use "transactions reporting", which means that all transactions of interest are recorded as they occur, so that an order will be placed when the reorder point is reached.

A periodic-review model is one that determines the quantity to be ordered to bring inventory position* up to a target level at fixed periodic intervals. This quantity varies from one period to the next. Periodic review appears to be much more widely used in industry today than transactions reporting, but the trend is toward transactions-reporting systems primarily due to the increasing use of high-speed computers.

*Inventory position is usually defined as "amount on hand, plus amount on order, less amount backordered".

A single-period model is used to determine the order quantity when only a single time period, such as a season, is involved and only one procurement is made. The type of problem to which this type of model is applicable is often called the "newsboy problem" or the "Christman-tree problem" because of the single time period during which the product may be sold. This type of model has applicability to style or fashion shoes as well as to staple shoes with seasonal demand.

The models discussed in this section are single-stage, single-item models in the sense that they apply to a single product being stocked at one location. These are the most highly developed models in the current literature. There are, however, a few highly sophisticated mathematical representations of multistage inventory systems in which an item may be stocked at a number of distinct locations. This type of system is present in a company that controls factories, warehouses, and retail outlets. So far, the models developed for such multiechelon systems are valuable largely as research tools and offer little aid for routine inventory management. However, use of single-stage models for independent stages of a multistage system usually results in significant improvement over inventory-control systems not based on scientific inventory control.

EDP in Inventory Management

The rapid development of EDP systems has provided important opportunities for changes in management thinking in recent years. Many of the current generation of high-speed, internally programmed digital computers are capable of performing a large portion of a corporation's routine clerical tasks, providing programmed decision making for repetitive operations, and serving as powerful experimental tools for testing new management policies. EDP in no way replaces management skills, but rather permits the astute manager to multiply his effectiveness by providing more data, more time for decision making, and more alternative courses of action than were possible prior to the advent of the digital computer.

Evolution of Applications

The evolution of computer usage in most companies generally includes several distinct changes. Initially, EDP is often used to perform routine clerical tasks such as preparing payrolls and maintaining inventory lists. In this stage, management is deluged with many detailed reports on inventory status and sales trends. All of the replenishing decisions are routinely made by managers. The only difference from manual methods is that more data are available more quickly than before. In the second stage of maturity, management begins to program routine decisions for the computer to make. For example, once inventory policies relative to when and how much to order have been established, the computer can maintain the records, issue the purchase orders, and flag exceptional cases for management attention. The third stage of maturity involves using the computer as an experimental device to test the effects of new management policies on system performance. For example, a particular item may currently be stocked on the basis of 4 weeks' average sales. The effects of changing this policy to stocking 6 weeks' average sales can be easily evaluated by computer simulation without disturbing current operations. The fully mature system then functions as a routine data processor, a control device, and an experimental tool.

Programmed Decision Making

A traditional technique of management is "management by exception". Using this approach, top management delegates routine decision making to subordinates and reserves its energies for exceptional situations. The use of electronic computers for inventory control is an extension of this basic idea. The general policies of when and how much to order or produce are established by management, programmed for the computer, and executed without further manual intervention unless exceptional circumstances arise. The electronic computer permits better control than could be obtained by delegating similar responsibilities to clerical personnel because of its extremely large data-storage capacity and high-speed processing. In addition to providing more accurate data, in the sense of fewer clerical errors, the computer can give more rapid response and better forecasts than manual methods.

A rapid response to sales demand is desirable not only from the point of view of customer satisfaction, but also for providing a more stable control system. It can be shown that in a multiechelon inventory system, time lags in receiving and processing information may cause stock-level perturbations that could easily be falsely interpreted as seasonal demand patterns. Only the electronic computer has the capability of handling all of the data needed in a properly designed integrated data processing system.

Meaningful forecasts of future demands and deliveries depend upon large volumes of data that can be analyzed rapidly on a routine basis. The number of stock items involved and the necessary history of each item preclude manual computation with the same speed and accuracy that can be obtained by EDP.

Simulation in Establishing Inventory Policies

Simulation refers to the dynamic operation of a model of a real system. The essential ingredients of a simulation study are:

(1) Data concerning the behavior of variables

(2) A statement of the rules that gives the outcome of various combinations of decisions and circumstances

(3) A statement of management policies relevant to the problem.

These are the same basic requirements placed on the actual control system. Simulation merely imitates the operation of the real inventory system under selected conditions of environmental data and management policies. It gains its power as an experimental tool only when large amounts of data with many different policies can be analyzed in a short time span. The electronic computer makes this possible.

Simulation can be used both before and after the installation of a programmed inventory-control system. Before the control system is installed, simulation can be used to improve operating policies based upon current estimates of demand, lead time, costs, etc. After the control system is operating, simulation can be used to evaluate proposed changes in existing policies, new market situations, and other parameter variations.

Simulation seeks to answer the same questions examined by the many available mathematical models of inventory systems. It is used because the existing analytical techniques are often not powerful enough to handle the complexities of inventory systems with many interacting items at a number of stocking points, each exhibiting unique demand patterns. It has the additional advantage of not being limited to a unique measure of performance such as minimum cost. A variety of measures such as inventory levels, shipment mode, number of shortages, and duration of shortage can be routinely provided. This ability to measure performance by a number of indices commonly used to evaluate the real inventory system is valuable both as an aid to understanding and as a means of validating the model with real-system performance.

One complaint often leveled against mathematical models of inventory systems is that they employ unrealistic approximations for input data. Simulation is not troubled by the problems of fitting demand and lead time data to known probability functions or smooth time functions. It can operate from tables of data actually generated by the inventory system being simulated, either by Monte Carlo techniques or by following the exact time history of those data.

An alternative to simulation is to perform experiments with the inventory system itself. Simulation is preferred for at least three major reasons. First, one can compress the time scale by reproducing in minutes a performance history that would take years to accumulate by watching physical-inventory behavior. Second, simulating system operation under a variety of policies is much less expensive than experimenting with the actual inventories. This reduced cost is possible because physical items are not being handled and, more importantly, because a poor policy decision on the simulator does nothing to jeopardize company profits. Finally, by simulation one can examine the effects of changing market conditions, supplier behavior, and other factors that might be impossible to control in the actual system.

Simulation is then a powerful tool for both initial policy decisions and continuing studies of dynamic inventory systems. When properly designed, it can become an integral part of EDP operations along with routine data processing and programmed decision making for inventory control.

APPENDIX B

COSTS RELEVANT TO INVENTORY POLICY

The relevant costs to be considered in establishing inventory policy are only those costs that are affected by the policy or inventory-control system. Such costs may be divided into five categories; these are costs associated with:

(1) Procurement or production

(2) Carrying inventory

(3) Stockouts

(4) Operating inventory-control system

(5) Obsolescence.

The elements that comprise these costs are discussed in this Appendix, and their relationships are shown in Figure B-1.

Procurement or Production Costs

Procurement costs are related to all inventory items procured from an external source. For a manufacturer that produces all finished goods sold, these costs would relate only to raw-materials inventory. Production costs are related to all finished-goods inventory items produced internally. Both procurement and production costs include costs that depend on the amount ordered and costs that are independent of the amount ordered.

Costs Dependent on Amount Ordered

The costs that are dependent on the amount ordered by purchase order or production order include the following three categories:

Cost of Units Procured or Produced. The unit cost of items often depends on the lot size. Frequently, quantity discounts offered by vendors or economies of production runs must be taken into account in determining the cost of the units procured or produced. Overtime premium costs required to produce items are relevant productions costs, although an accounting system may include such costs in a general overhead account and not in the direct cost of items produced.

Transportation Costs. Transportation costs for delivery of goods from their source to the storage location depend on the quantity delivered.

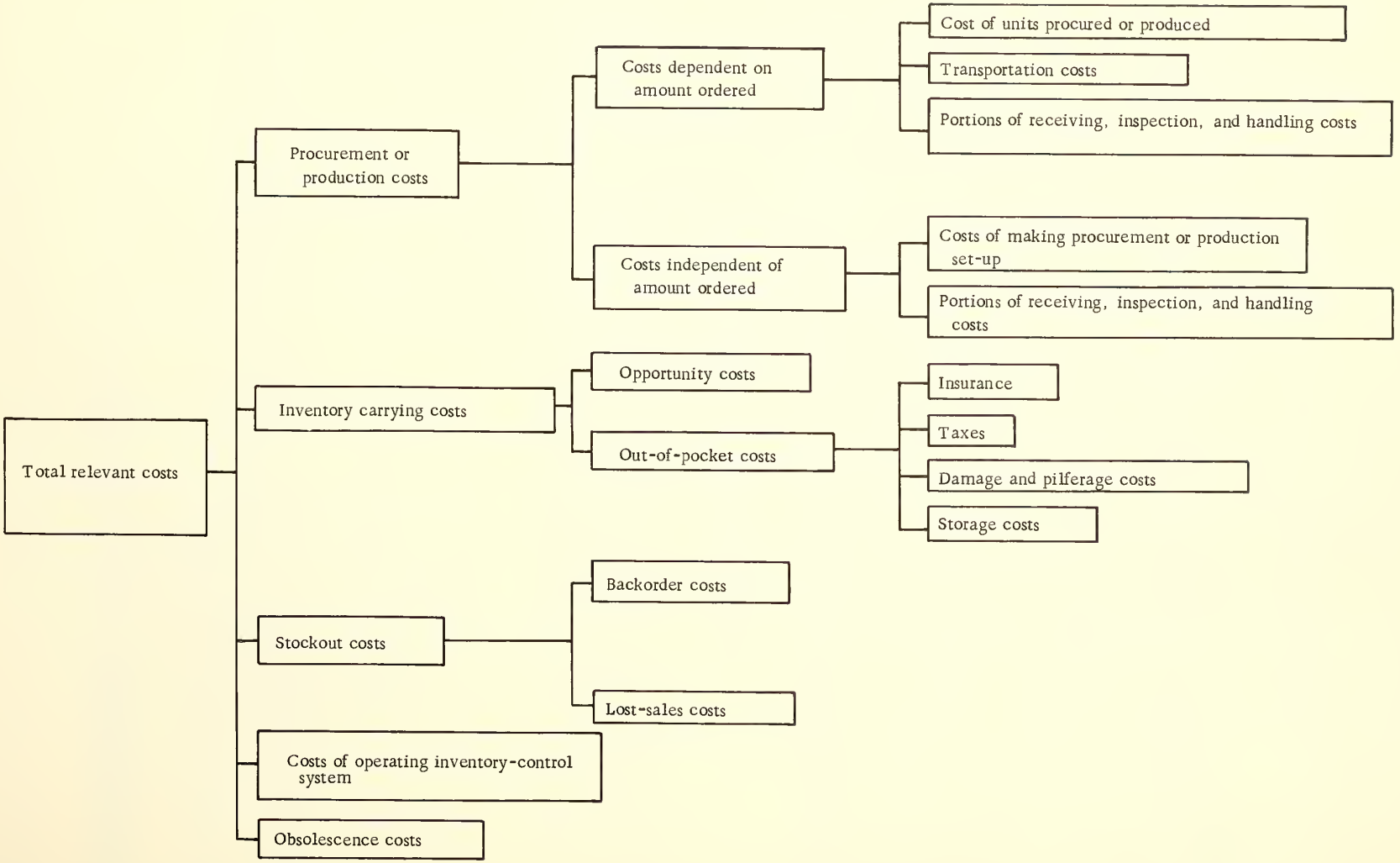

FIGURE B-1. RELEVANT INVENTORY COST RELATIONSHIPS

Receiving, Inspection, and Handling Costs. The costs of receiving, inspection, and handling are related to the quantity in each lot of goods received at the storage location, although portions of such costs are independent of the lot size.

Costs Independent of Amount Ordered

The costs that are independent of the amount ordered, or fixed costs of placing an order, are incurred each time an order is placed. These costs fall into the following two categories:

Costs of Making Procurement or Production Set-up. This category includes costs of processing a purchase order or production order such as labor costs in the purchasing, production, or accounting departments. It includes the set-up or change-over costs in manufacturing operations if the items are being produced internally. Also included are paper, postage, telephone, and possibly computer costs required in processing purchase orders or production orders.

Portions of Receiving, Inspection, and Handling Costs. Certain minimum costs of receiving, inspection, and handling are required regardless of the lot size, and may be considered independent of the amount ordered.

Inventory Carrying Costs

It is generally accepted that annual costs of carrying inventory vary between approximately 15 and 25 percent of the average dollar inventory investment. An annual inventory carrying charge of 20 percent has been quoted as typical for the shoe industry by a number of industry executives.

In establishing the policies of an inventory-control system, it is important to examine the cost elements that are included in the overall costs of holding or carrying inventory. These cost elements include opportunity costs and out-of-pocket costs related to insurance, taxes, damage, pilferage, and storage.

Opportunity Costs

The opportunity costs, although not out-of-pocket expenses, are often the most important element of the carrying charge, although such costs would not be included in accounting statements. The investment of capital in inventory may force a company to forego opportunities of using this capital for other valuable purposes. The opportunity cost is equal to the largest rate of return that could be earned from alternative investments; this cost might also be termed the alternative-use value. The opportunity cost would always be at least as great as the interest rate on Government bonds and other secure investments. If a company has outstanding debts, the opportunity cost would be at least as great as the interest rate being paid the lender, provided debt-prepayment would not incur a penalty.

The opportunity costs are incurred at a rate proportional to the inventory investment at any given time, although the rate may change with changes in the money market or the company's investment opportunities and debt position.

Out-of-Pocket Costs

Insurance. Insurance policies that cover inventory loss due to fire or other casualities are normally written for a fixed period of time, such as 1 year. Since the premium for the period is fixed and inventory levels fluctuate during this period, insurance costs are not incurred at a rate that is strictly proportional to the inventory investment. However, when the policy is rewritten, the amount of coverage would normally be changed in the light of anticipated changes in inventory levels, and over a long period of time insurance costs would be expected to vary approximately in proportion to inventory investment.

Taxes. Taxes on inventory assets are not assessed uniformly by the states, although such taxes are often based on the inventory on hand at a particular date of the year.

Damage and Pilferage. A certain risk exists that items in inventory may be damaged or pilfered. The cost of such losses can usually be expected to increase approximately in proportion to the increase in inventory level.

Storage. The cost of storing inventory includes warehouse or storage-space operating costs (such as heat, electric power, and security guards) and warehouse rent (if building is not owned by the company holding the inventory) or (if owned by such company) building costs such as insurance, taxes, maintenance, repair, and opportunity costs based on present market value of the building. Like insurance, the storage cost is not incurred at a rate which is strictly proportional to the inventory investment. However, over a long period of time, storage costs would be expected to vary approximately in proportion to average inventory investment if the "mix" of inventory items remains essentially the same with respect to unit dollar value and storage-space requirements.

Stockout Costs

Stockout costs occur as a result of backorders or lost sales. If no orders are received during this period for which an item is out of stock, then no stockout costs are incurred.

Backorder Costs

Backorder costs occur when an order is received from a customer for an item that is out of stock and the customer must wait for later delivery. Backorder costs often cannot be directly measured. One of the most significant elements of backorder costs might be loss of customer goodwill, which may result in a reduction in future orders from dissatisfied customers. In a production plant, backorder costs are incurred when a needed raw-material item is out of stock and the production process is delayed or

stopped. Other backorder costs may include the costs of determining when the customer's order can be delivered and notifying him, and costs of special expediting. Backorder costs are often considered to be dependent on the time for which a backorder exists.

Lost-Sales Costs

Lost-sales costs occur when an order is received from a customer for an item that is out of stock and the customer is unwilling to wait for later delivery. The most obvious element of this type of cost is the lost profit on the items for which the sale is lost; however, the most important element of cost again might be the loss of customer goodwill. Other lost-sales costs may include the cost of the procedures for informing the customer that his order cannot be filled. In contrast with backorder costs, lost-sales costs are not dependent on time.

The level of lost sales due to stockouts for branded-shoe manufacturers is typically in the range of 5 to 10 percent of annual sales on a dollar basis.

Costs of Operating Inventory-Control System

The costs of collecting inventory data, maintaining inventory records, analysis of inventory data, making demand predictions, and making order decisions are elements of the cost of operating the inventory-control system. This system operating cost will include labor and may include computer or other equipment costs.

Obsolescence Costs

Obsolescence cost for an item that must be disposed of at a loss may be defined as the difference between total cost of the item (original procurement or production cost plus inventory carrying cost) and its salvage value. In the shoe industry, obsolescence costs are represented by losses on markdowns. Such losses are often sustained on fashion shoes.

General Comments

The foregoing discussion has pointed out the major costs that are generally relevant to inventory policy. The magnitude and relative importance of each cost element is dependent upon the special circumstances of each individual inventory system.

It is emphasized that the costs that are relevant in establishing an inventory policy or control system are only those costs that can be affected by the policy or system selected, and that special effort or studies may be necessary to estimate certain relevant costs. For example, the costs of filling customers' orders (requisitions, shipping

documents, packaging, handling, shipping, and invoices), although dependent on demand, do not generally depend on the inventory policy or control system and are not included as relevant costs. On the other hand, loss of goodwill can be a very significant factor in establishing policy, although such costs are not obtainable from accounting records. In some cases, where accurate estimates of intangible costs, such as goodwill loss, are not attainable, the importance of the factor can be recognized in a mathematical model without necessitating the use of a cost estimate. This is done by mathematically imposing a constraint, such as minimum service level, or percent of time out of stock, for an inventory item. The inventory model is then solved based on minimum inventory costs attainable under the minimum service-level constraint.

APPENDIX C

FORECASTING FOR INVENTORY CONTROL

Forecasting denotes an objective computation used to estimate what will happen in the future. The problem of obtaining accurate forecasts of future sales is especially critical to managers of finished-goods inventories in the shoe industry where style preference may follow marked seasonal patterns. All inventory managers make forecasts or act as though they had one. The implied dependence of inventory performance on forecasting accuracy is not actually increased, but it is emphasized when scientific reorder rules are used.

There is a growing body of literature devoted to mathematical analysis for forecasting near-term sales as well as longer-range market trends. The purpose of such mathematical tools is to provide management with the most objective estimates possible. This does not mean that subjective evaluation is replaced, it merely implies that the inventory manager now has a more objective forecast that becomes a part of the data upon which he exercises his judgment in reaching a decision.

Available Techniques

Two major classes of mathematical techniques are used to develop forecasting models. One is time-series analysis and the other is probability forecasting.

The components of a time series include the average level of demand at some point in time, nonseasonal trends in the average over time, seasonal patterns of variation about the trend line, and random variations from the trend and seasonal patterns. Time-series analysis attempts to predict the time-varying behavior of demand for particular products through careful examination of the above-mentioned components. For example, a particular style and color of women's footwear may exhibit marked seasonal fluctuations in sales as well as a long-term growth trend. The techniques of time-series analysis could be used to identify which products have such characteristics and to estimate how many units will be demanded during the next planning period. By means of these scientific models, trends and seasonal variations not readily apparent from cursory examination of historical data may be readily identified. At the same time, they provide a means of responding to genuine changes in market conditions without being unduly sensitive to random variations in sales patterns.

A large number of specific models have been constructed to handle particular classes of products. Some variations are necessary to account for different degrees of demand and production stability. Others are designed to be efficient in terms of data manipulation. Stability and speed of response are factors that must be traded off in time-series forecasting systems. A stable system is one that responds slowly to changes in market conditions and consequently is little affected by random variation in monthly sales patterns. This characteristic must be balanced with the need for rapid response in inventory levels to genuine changes in market conditions. An overly responsive system is undesirable in that unnecessary fluctuations in inventory levels may be triggered by unique sales conditions for a short time period.

Some particular models of the time-series class are moving average, weighted moving average, line ratio, exponential smoothing, and its many variations. The most naive model is one that projects sales for future months as a simple average of past sales. A moving average uses only the most recent data for forecasting. A weighted moving average assigns weights to different months' sales, usually the most recent figures being given the most weight. The line-ratio method commonly used in the retail trade attempts to account for seasonal patterns by assuming that each month this year will contribute the same portion of total sales that it did last year. Exponential smoothing is a technique designed to provide efficient data manipulation, in that only two numbers, a past average and current level, are needed to make the forecast. Variations of exponential smoothing may be used to assist in trend and seasonal calculations as well. The choice of the smoothing constant determines the relative stability and responsiveness of the system. Adaptive smoothing is a technique using only recent data in an attempt to provide quicker response to changes in underlying demand patterns.

Two types of demand lend themselves well to probability forecasting. Many relatively high-demand items do not exhibit marked trend or seasonal patterns, although month to month demand may fluctuate widely. In this instance, protection levels are best established in terms of the probability that demand will fall in any given interval during the next planning period. Even for products with seasonal and trend patterns, a probability estimate of future demands that is periodically revised may be the best forecasting scheme. Products that are demanded relatively infrequently are a second type for which probability forecasting is best. A time-series representation of sales for such products would be a string of zeros with an occasional lump of demand appearing. Probability models abstract from such a sequence of observations information about the shape of the distribution and suppress information about the sequence pattern in time. Many of the mathematical models designed to determine optimum reorder rules depend upon probability forecasting.

Data Needs

The success of any of the scientific models for demand forecasting depends upon the availability of "clean" data. It is well to remember that control of finished-goods inventory should be based upon the number of units the ultimate customer would take if he could get them. This implies several major restrictions upon the sources of data one might use for demand forecasting. For example, shipment data are very poor indicators of time-demand patterns. Such data may reflect demands that occurred some time ago as well as the special rules different warehouse managers may be using to control their inventories. They often give no indication of the time pattern of actual sales to the ultimate consumer, and they do not include the potential sales that may have been lost when the retailer was unable to supply the product demanded. The danger of false demand indication is increased when a multiechelon distribution system operates with inventory rules at each level determined independently from all others. In such cases it may be cheaper for the factory to install a monitor system at the retail level than to develop elaborate forecasting schemes based upon spurious signals from middlemen.

Another requirement for clean data is that unusual circumstances be screened from the input provided to the forecasting system. For example, a special promotional effort may lead to a large increase in sales this month. Unless this effort is repeated each year, it would be unreasonable to use that data in a forecasting model that might

falsely interpret it as an indication of new-trend or seasonal factors. Screening can be accomplished by means of control-chart-type techniques in which statistically improbable events are flagged for special management attention before they are included as input for future forecasts. By the same token, management should revise the objective forecast upward when they have knowledge of some special event that might increase next month's sales over the usual pattern.

Coupled with the previously mentioned requirement for clean data is the need for rapid data collection. An ideal forecasting system operates in real time in the sense that the prediction for demand in the next time period is updated with each observation and certainly between every decision point.

The Role of EDP in Forecasting

One of the characteristics of the modern digital computer is that it can be programmed to produce forecasts. Forecasts can generally be obtained more accurately and more cheaply by use of a computer than by manual means. It is possible to make a dynamic forecasting system an integral part of computerized inventory-control procedures, with exceptional cases being flagged for special management attention.

Because of the computer's large capacity for data storage and high processing speeds, it is now feasible for companies to institute integrated data-processing systems for inventory control. With the cooperation of retailers, such systems can be used to give the most accurate forecasts yet devised for ultimate customer demands. In this instance, demand at the retail level would be recorded as it occurs rather than permitting it to be distorted in passing through several levels of the distribution system. In addition, it is feasible to provide assistance in formulating reorder rules at every level of the distribution system. Such service is of value to everyone concerned not only for being able to respond rapidly to changing customer needs but also for reducing both the investment needed and customers lost at every level.

APPENDIX D

WORK-IN-PROCESS INVENTORY CONTROL

A major function of all inventories is to act as a buffer between subsystems. Raw-material inventories serve to smooth the effects of variable supplier behavior on production scheduling. Finished-goods inventories act as a dampening device between variable sales patterns and production schedules. Work-in-process inventories permit this same process of production smoothing to be carried to the level of individual machines and work stations in the production system.

Although in-process inventories exist in every production environment, they have not been treated as extensively in the technical literature as the more direct inventory problems. Experience, intuition, and competition have led to the development of effective systems even though they are not fully understood. It is expected that the application of mathematical techniques can lead to better understanding and thus to more efficient systems. The mathematical treatment most often suggested in theoretical literature for work-in-process inventories is analysis as a multistage queue model.

Buchen and Koenigsberg[36] report several models of in-process inventories treated as multistage queues. In nearly every case, variation in total output of a system as a function of changes in in-process inventory is emphasized. Models for a sequential array of single-channel queues as well as cyclic queues have been developed. A cyclic queue is a closed loop of stages within which circulates a finite number of customers. This model appears particularly applicable to shoe-making operations in which the workpiece is affixed to a last. The lasts that complete service at the final stage are returned to the first stage. From such models it is possible to obtain measures of performance such as the number of units waiting at each stage and the fraction of time a particular stage is not working.

Models emphasizing the smoothing properties of in-process inventories have been developed by Pepper[37]. He describes means of determining the length of cycle of rotation and the length of individual runs for separate production facilities that are required to work on several different jobs. Schedules are established such that on the average each job may be carried out without acquiring an eventual surplus or deficit of any item.

In-process inventories are analogous to inventories held as finished goods in that they serve to smooth the flow between successive manufacturing operations. For that reason it appears possible to use a modified version of models such as that developed by Winters[38]. In this case, one views the desired aggregate production of a facility as a constraint on the usual economic lot-size formulation. The methods of Lagrange multipliers may then be employed to minimize the sum of inventory costs for all items subject to the given constraint. The major difficulty in applying this model to in-process inventories would be obtaining appropriate cost figures for the criterion function. Other models such as those developed by Holt et al.[39] also consider the task of planning production levels that reduce the peaks and raise the valleys in translating fluctuating sales into factory production. Perhaps some of their methods could be modified for use at the level of individual producing units.

Although more research is needed, mathematical analysis does appear to offer a rational means of selecting in-process inventory levels. Both descriptive and prescriptive models of a limited nature have been discussed. The queuing models are descriptive in that they merely describe the behavior of the system when subjected to alternative rules. The modified finished-goods models are prescriptive in that they attempt to prescribe an optimum solution in terms of minimum costs.

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III

RESEARCH AND DEVELOPMENT IN THE UNITED STATES SHOE INDUSTRY

A Revolution Presents Major New Needs and Opportunities

by

Robert L. Crosby

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RESEARCH AND DEVELOPMENT IN THE UNITED STATES SHOE INDUSTRY

A Revolution Presents Major New Needs and Opportunities

by

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EXECUTIVE SUMMARY

A revolution in the environment of the nonrubber shoe industry has created a new world of shoe-making in which research will become a major force of competition. For the individual manufacturer and for the whole industry, the revolution requires a new look at research.

Analysis

Regarding shoe machinery, solutions to the traditional technical problems blocking automation – nonuniformity of materials, complex shapes, and multiple, nonstandardized products – are now at hand or on the horizon. Antitrust action has changed the traditional structure of the shoe-machinery industry. These changes present new opportunities to improve and to automate shoe manufacture, but shoe manufacturers must now play a leading role in machinery development.

In the materials area, a competition among large chemical companies for the synthetic-materials market will vastly accelerate the flow of new materials and force manufacturers to adopt well-advertised new materials much faster. CORFAM is the first of many. The chemical giants will also participate in shoe construction, machinery, fit, and style research in order to increase sales of their materials. Faster flows of well-advertised new materials will present much greater needs for testing by shoe manufacturers, and cooperative research with chemical companies will provide some shoe manufacturers with major research and merchandising advantages.

Internationally, the acceleration of postwar technology has made European shoe manufacturers stronger competitors and has made Europe an important source of new shoe technology. Executives in the United States shoe industry have begun to search for ways to strengthen company and industry research.

In machinery, there are new opportunities and competitive needs for machinery improvements and automation research, and the shoe manufacturers will have to play a leading role, because there is not a strong economic incentive for other firms to lead in this area. Accelerating materials development will present new testing needs, and new opportunities for joint testing and merchandising with chemical giants. New materials and machinery will present new opportunities for shoe-construction research. Recent reports have indicated a high payoff from some areas of fit research. And new market-research techniques and tools will lead to better and more efficient merchandising.

Among these areas of research, materials testing and machinery- and production-research appear the most promising because they will result in substantial cost savings. Materials testing that can reduce materials costs by only 4 percent would save the industry $52 million dollars every year and boost profits 50 percent for the individual company now earning 4 percent on sales. Machinery- and production-research could, by boosting productivity only 8 percent, also save the industry about $50 million annually and boost profits 50 percent for the manufacturer now making 4 percent on sales.

At present, most shoe manufacturers in the United States have no research capability, but a few leaders are carrying on impressive and beneficial research programs. Efforts to begin cooperative research in the industry have not succeeded to date, because the dollars-and-cents benefits of cooperative research have not been recognized by company managements.

The individual shoe manufacturer should build his research capability in two phases first, use research information available outside, and second, begin in-company research. The two key steps in the first phase are: (1) to hire a technical man, and (2) to gather information from SATRA, other shoe manufacturers, suppliers, and the growing technical literature.

Cooperative research is a necessity for companies too small to support much company research. The shoe manufacturers with strong research can gain even more from cooperative research because they can use the results faster and better. The research leaders have an opportunity to move far ahead of other United States manufacturers and foreign competitors by cooperatively sponsoring a major program to apply technological advances from other United States industries to automated shoe manufacture.

The shoe industry can establish cooperative research through a permanent organization like SATRA and/or through cooperative sponsorship of contract research. Permanent cooperative research could involve merely joining SATRA, arranging for a North American branch of SATRA, or establishing a separate United States organization like SATRA.

One of these three SATRA-related approaches will probably be best for cooperation in areas of research where all companies can gain: coordination of shoe-research information, materials testing, machine and production-process improvement, and some other research. The first step should be to join the present British SATRA.

In the very promising research area of developing radically new shoe-production methods using new technology from other United States industries, only the technically and financially strongest companies can gain, and SATRA will be of less help. Thus, research in this area should be cooperatively sponsored by the leading United States shoe manufacturers through a United States contract-research organization familiar with these new United States technologies as well as with the shoe industry.

Recommendations

(1) United States shoe manufacturers that presently carry out research have an important competitive advantage and should keep and increase their advantage by

(a) Increasing company research strength

(b) Performing joint work with chemical companies

(c) Supporting all cooperative shoe-research programs

(d) Initiating a major cooperative program among the leaders to apply new outside technologies for automated manufacture of shoes, thereby using their technical and financial strength to move farther ahead of United States and foreign competitors.

(2) The manufacturers without research today should begin now to develop a research capability. Manufacturers too small to support company research should cooperate. Companies without research capabilities will have to depend heavily on cooperative research, particularly in the early stages.

(3) The United States shoe industry should work toward cooperative research by taking the following steps through the trade associations

(a) Establish a United States shoe technical-information center

(b) Encourage United States companies' membership in SATRA, and explore possible new arrangements between the United States industry and SATRA

(c) Organize an industry committee to study and promote the benefits that can be achieved from cooperative research

(d) Standardize nomenclature and dimensional definitions, to provide a common technical language as a basis for cooperative research.

SHOE-INDUSTRY RESEARCH: NEEDS AND OPPORTUNITIES TODAY

Revolution in the Shoe-Research Environment

Today, massive changes in the nonrubber shoe industry environment are creating a new world for research. * These changes are burying some of the traditional reasons for low research efforts in the industry and are creating major new research needs and opportunities for shoe manufacturers.

There are four major areas of change in the shoe-research environment:

(1) The machinery environment;

(2) The materials environment;

(3) The international competitive situation (marketing and technical); and

(4) United States shoe manufacturers' attitudes toward research and cooperation.

In these four important areas, revolutions are taking place. These changes present United States shoe manufacturers with a new and unfamiliar research situation; they make past policies regarding research inappropriate for the future and require a new examination of research needs, research opportunities, and research programs.

Shoe Machinery

The Traditional Shoe-Machinery Environment. Partly because of the technical and economic nature of shoe manufacturing and partly because of United Shoe Machinery's dominant position and policies, the traditional shoe-machinery situation has exhibited the following features:

(1) Many small plants, with little capital investment by manufacturer

(2) Almost no research by shoe manufacturers

(3) USM research aimed primarily toward improvement of present shoe machinery

(4) Other shoe-machinery manufacturers remain few and small

(5) Slow technical progress.

Some of the more important relationships between the causes and the results in this traditional situation are diagrammed in Figure 1.

*The term "research" as used in this report refers to the activity of "development and analysis of information as a basis for management decisions, where such work requires advanced formal training and sophisticated methodology" It is impossible to draw a precise line as to just how sophisticated the work must be to be called research. In general, the term research refers to technical work, but in this report it also includes studies of markets where such studies involve scientific techniques.

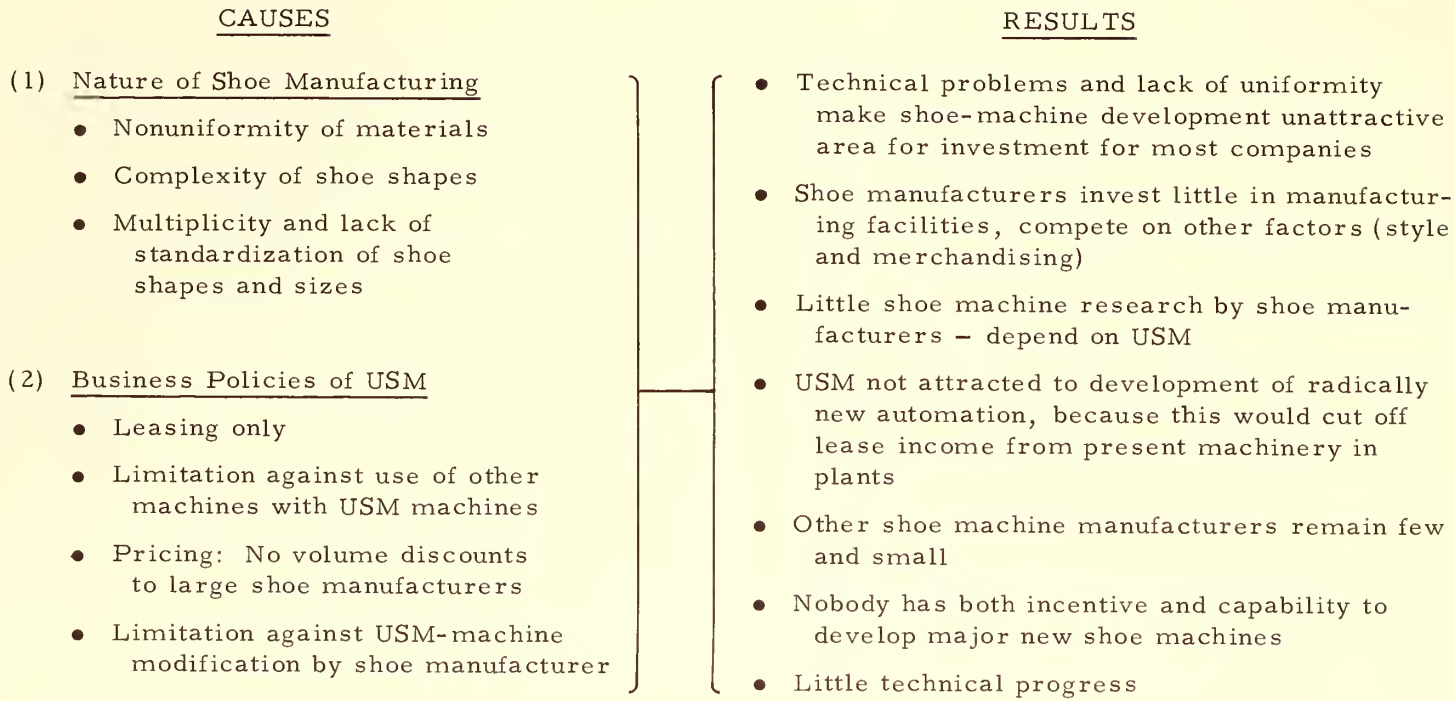
CAUSES
(1) Nature of Shoe Manufacturing
• Nonuniformity of materials
• Complexity of shoe shapes
• Multiplicity and lack of standardization of shoe shapes and sizes
(2) Business Policies of USM
• Leasing only
• Limitation against use of other machines with USM machines
• Pricing: No volume discounts to large shoe manufacturers
• Limitation against USM-machine modification by shoe manufacturer
RESULTS
• Technical problems and lack of uniformity make shoe-machine development unattractive area for investment for most companies
• Shoe manufacturers invest little in manufacturing facilities, compete on other factors (style and merchandising)
• Little shoe machine research by shoe manufacturers – depend on USM
• USM not attracted to development of radically new automation, because this would cut off lease income from present machinery in plants
• Other shoe machine manufacturers remain few and small
• Nobody has both incentive and capability to develop major new shoe machines
• Little technical progress

FIGURE 1. THE TRADITIONAL SHOE-MACHINERY RESEARCH ENVIRONMENT

Three major technical characteristics of shoe manufacture have restricted machine development progress: (1) nonuniformity of materials, (2) complexity of shoe shapes, and (3) wide varieties of nonstandardized products. Nonuniformity of leather has kept leather cutting essentially a manual job because human judgment is required to decide how to cut each unique piece. Leather-cutting machinery has been limited to operator-guided "power-assist" machinery.

Complexity of shoe shapes makes design of automatic shoe machinery a difficult and expensive job, and wide variations of nonstandardized shoe sizes and shapes presents a requirement that an automatic shoe machine either be very flexible or be used for only a few shapes and sizes. These factors together have traditionally kept development of automatic shoe machinery unprofitable; costs are high and the uses of each machine are low.

Policies of United Shoe Machinery Corporation (USM) have until recently included: (1) leasing of all shoe machinery (the shoe manufacturer could not purchase these machines), (2) denial to shoe manufacturers of the right to use machines of other manufacturers in combination with USM machines, (3) denial to shoe manufacturers of the right to modify USM machines, and (4) pricing of machine leases in a manner that provided no discount to larger purchasers. Because of USM's dominant position in the shoe machinery business, these policies, together with the nature of shoe manufacturing, have powerfully affected the shoe-machinery situation.

The technical difficulty of automating shoe manufacture, together with USM's pricing policy, have tended to keep size advantages to a minimum and thus to keep shoe companies and shoe factories small. Lack of automated machinery, together with USM's lease-only policy, have helped to keep shoe manufacturers from doing much research on machinery. Indeed, many shoe manufacturers have preferred it this way; all on the same level in production capabilities, they have competed primarily through styling and merchandising, with a minimum of investment in facilities.

Similarly, the technical difficulties and low payoff from shoe-machine development and USM's rule against their customers' use of other machines have kept the shoe-machinery business unattractive to potential competitors. USM remained dominant and other shoe-machine companies remained few and small.

Thus, the shoe manufacturers had to – and were for the most part happy to – depend almost totally on USM for shoe-machinery development. USM had a strong and capable R&D department, but USM's dominant position in leasing the equipment in use presented a powerful reason against developing radically new shoe machines. To use new machines, shoe manufacturers would have to stop using the present USM machines for which USM was receiving lease income. USM would lose from development of new machines unless the income from new machines was enough higher than income from present machines to pay for development costs, which in view of technical problems in new-machine development, was unlikely.

So the shoe machinery world moved very slowly, for natural technical and business reasons.

The Machinery Revolution Begins. In the last 10 or 12 years, virtually every cause of traditional slowness in shoe-machine development has been substantially reduced. The changes and their effects on the shoe-machine-research environment are summarized in Figure 2.

On the side of shoe-making technology, the emergence of Du Pont's CORFAM and other synthetics has provided an answer to the nonuniformity-of-leather problem that held back material-cutting automation. Already a machine has been developed capable of cutting various synthetic shoe components at the rate of two million per week, an amazing 13,000 percent increase over the production rate of traditional cutters.

Regarding the technical barriers to automation presented by multiplicity and complexity of shoe shapes, two factors suggest that potential solutions are in sight. One is increasing willingness of manufacturers to standardize some factors that don't affect style. While very little has actually been accomplished to date in standardization, recent attempts to initiate standardization indicate growing interest.

The second factor, very rapid recent technological advancement in other United States industries, provides considerably greater opportunity to overcome the complex-multiple-shapes barrier. Since World War II, the aerospace, electronics, and machine-tool industries have gone far beyond what one might have imagined 20 years ago in developing new electronic and electromechanical methods for automated manufacture of complex shapes in metal and other materials. Applications of some of this new technical capability to shoe manufacture could well permit economical automated shoe manufacture with little or no standardization of shoe shapes.

Thus, there are now at hand or on the horizon solutions to virtually all the traditional technical barriers to automated manufacture of shoes.

The 1955 antitrust decision against USM forced revision of some of USM's policies. For example, USM was forced to offer for sale its in-plant shoe machines to shoe manufacturers at favorable prices. Shoe manufacturers have already purchased almost three-quarters of these machines.

It is impossible to define now the final effects of this antitrust case, because it is still under review and contention. A major new decision may be made in 1966. But it is revealing to review the effects to date on USM strategy, and it is apparent from such a review that USM's role in the shoe-machinery world is changing.

The 1955 decision virtually forced USM to concentrate on new areas of business outside the shoe industry. USM has responded to this force very capably by diversifying into other areas of business using technical capabilities originally developed for shoe machinery. Table 1 illustrates how USM has managed to become less dependent upon shoe-related business.

TABLE 1. DEPENDENCE OF USM ON SHOE-RELATED BUSINESS

Year	Shoe-Related Income as Percent of Total Income
1955	100
1961	80
1965	50

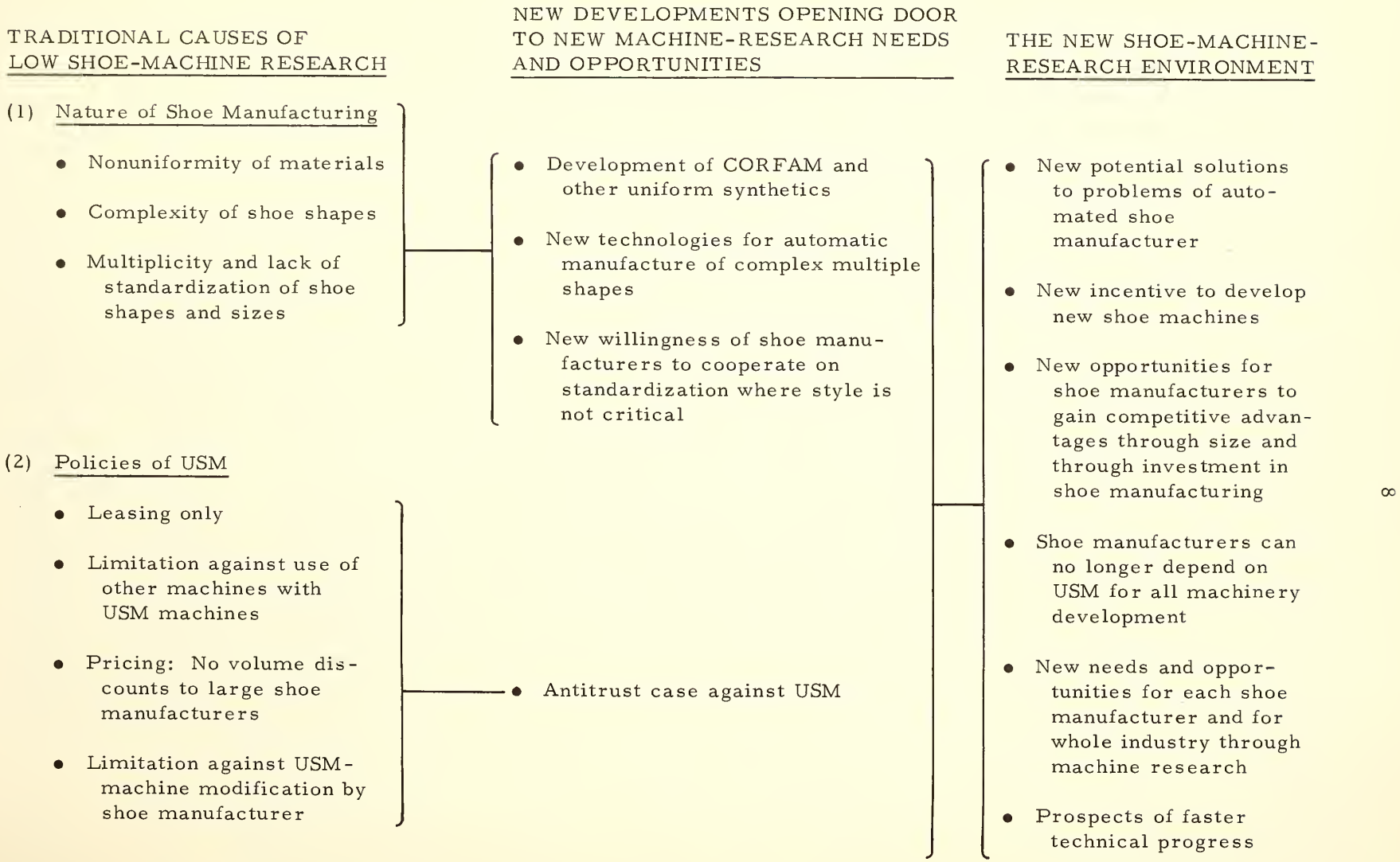
TRADITIONAL CAUSES OF LOW SHOE-MACHINE RESEARCH
(1) Nature of Shoe Manufacturing
• Nonuniformity of materials
• Complexity of shoe shapes
• Multiplicity and lack of standardization of shoe shapes and sizes
(2) Policies of USM
• Leasing only
• Limitation against use of other machines with USM machines
• Pricing: No volume discounts to large shoe manufacturers
• Limitation against USM-machine modification by shoe manufacturer
NEW DEVELOPMENTS OPENING DOOR TO NEW MACHINE-RESEARCH NEEDS AND OPPORTUNITIES
• Development of CORFAM and other uniform synthetics
• New technologies for automatic manufacture of complex multiple shapes
• New willingness of shoe manufacturers to cooperate on standardization where style is not critical
• Antitrust case against USM
THE NEW SHOE-MACHINE-RESEARCH ENVIRONMENT
• New potential solutions to problems of automated shoe manufacturer
• New incentive to develop new shoe machines
• New opportunities for shoe manufacturers to gain competitive advantages through size and through investment in shoe manufacturing
• Shoe manufacturers can no longer depend on USM for all machinery development
• New needs and opportunities for each shoe manufacturer and for whole industry through machine research
• Prospects of faster technical progress

FIGURE 2. THE NEW SHOE-MACHINERY RESEARCH SITUATION

Increased investment in shoe-machinery research certainly has not been as attractive to USM as investment in other areas during the 10 years during which the antitrust case has been active because there has been constant unpredictable risk of further court action. And it may be that shoe-related business will never again be the most attractive area for USM research. Inevitably, the role of USM in the world of shoe machinery will not in the future be what it has been in the past.

In some ways, this is good for the shoe manufacturers. It opens to them the door to improve their machinery, a door that was formerly closed. It opens the door for manufacturers to gain competitive advantages through greater investment in machinery, and it opens the door for other shoe-machinery manufacturers. It also removes from the shoe manufacturers their traditional dependence upon USM. It forces* them to compete in an area in which most of them have traditionally had little capability and to initiate shoe-machine research. It presents them with needs as well as with opportunities.

It is unlikely that another shoe-machinery company will come in and take the place of USM. It has been reported that large machine-tool companies have looked closely at the shoe-machinery area and decided against entrance because of the technical and business problems, which apparently made the investment appear unattractive. There is not sufficient economic incentive to attract outsiders into shoe-machinery research.

For this reason the shoe manufacturers themselves are forced to play a much larger role in development of new and better shoe machines. The new environment – new technical solutions and new shoe machine-industry structure – will inevitably draw the leading shoe manufacturers into shoe-machinery development. And this will force all shoe manufacturers to compete to survive. Investment in shoe-machinery research and in automated shoe factories will become an important new arena of competition among shoe manufacturers.

The revolution in the shoe-machinery environment presents the whole shoe industry a new opportunity to improve its competitive position relative to foreign shoe industries, and its rank among United States industries, through investment in automation.

Shoe Materials

Du Pont's massive CORFAM program is only the start of competition among some of the world's largest research-based companies for the shoe-materials market. This competition in research will be too strong and fast for the shoe manufacturers to take part in, but the shoe manufacturers will have to improve their research capabilities just to keep up with the new shoe technologies developed by the chemical giants. They will have to become capable – through cooperative research and individual-company

*At several points in this report is is stated that shoe manufacturers are or will be "forced" to do certain kinds of research. Obviously, a businessman can follow any legal set of policies he pleases – at least for a short time – so it is necessary to explain just what is meant by the term "forced".

Basically, what is meant here is that, since the opportunities will be sufficiently profitable to provide an incentive for some companies to do more and more research and to gain from the research, other companies will also want to do research just to keep the research leaders from gaining an overwhelming advantage. Even a company that has traditionally based its success solely on some other factor such as outstanding merchandising will have to do more research or its merchandising lead will be offset by the growing research leads of others. To stay even in other areas, and thereby to fully exploit its merchandising superiority, the company will be "forced" to do research.

research – of evaluating radically new materials quickly and of finding new ways to use materials in shoe manufacturing. They will have to develop the capability to survive in a world of rapidly advancing technology and sophisticated research.

The Coming of the Research Giants. It was reported by Boot and Shoe Recorder that Du Pont spent over $25 million over a 25-year period in the poromeric research program that led to CORFAM. It stated that "No other product in the history of the shoe industry has had such an enormous investment behind it". Du Pont reported that 200 man-years of research and 3 years of intensive testing were required before CORFAM was introduced to the market in 1963. Company executives described the testing program as follows:

> "The most important part of our venture, of course, was to assure ourselves and the shoe industry that our product was completely satisfactory. To do this we had more than 16,000 pairs of shoes of CORFAM made in 200 factories to determine its acceptability as far as shoemaking. To investigate acceptability to the consumer, we carried out extensive wear testing and comfort studies. Part of these studies concerned the foot health aspects of CORFAM shoes. Outside authorities conducted medical and comfort studies that determined our product to be completely acceptable in foot health considerations, even to be non-allergenic, providing relief for that segment of the population that cannot wear traditional footwear."

> "Through numerous wear-testing efforts with consumer panels outside of Du Pont, we obtained a great deal of information on the reaction to our product's appearance, color, comfort, durability, neatness, scuff resistance, shape retention, weight, and other factors. All of these helped define the relative levels we had to achieve before we could enter the shoe market."

Du Pont's systematic analysis of the CORFAM program preceding market entrance included development of a "venture analysis" model so complex that computers of the Defense Department were required. The venture-analysis model is a technique through which all factors, tangible and intangible, present and future, are described in mathematical terms. The CORFAM model provided a picture of (1) the dynamic shoe market at three levels: manufacturer, retailer, and consumer; (2) existing and potential competitive suppliers of shoe-upper materials; and (3) internal du Pont operating costs and investments. (1)

It is estimated that du Pont spent $2 million in national consumer advertising in 1965 for CORFAM alone – compared with about $1.6 or $1.7 million for the entire leather industry.

Is Du Pont's massive shoe program unique? No – it's just the start of a massive competition in the shoe market among the giants of the chemical industry.

(1) For a more complete description of the Venture Analysis Model, see Abercrombie, David E., "Venture Analysis – New Marketing 'Brain'", Boot and Shoe Recorder, April 1, 1956, p 87.

Du Pont has the lead now. Shoe-industry executives estimate Du Pont's present lead at 3 to 10 years, but several other companies have already announced development of new products suitable for shoe uppers. Union Carbide and Goodyear in the United States, Imperial Chemical in England, Carl Freundenberg in West Germany, and other companies in Japan and elsewhere have new shoe materials under development. These companies have the financial, technical, and managerial capabilities to compete effectively with Du Pont, and they will.

The main target of this competition is the shoe upper market, which attracts the chemical companies for several reasons:

(1) Market size. The market for shoe uppers is estimated at $400 to $500 million in the United States alone.

(2) Technical weaknesses of leather. Leather's nonuniformity presents serious manufacturing problems, and uniform synthetics will hold a powerful advantage on this factor.

(3) Limited leather supplies. It is expected that world supplies of leather will fall well below needs for leather-like materials by the 1980's.

In view of Du Pont's present lead, the other companies will have to develop better products to capture shares of the market. Each successive product will have to be better in some way than the preceding products. Thus the new competition for the shoe-supply market will produce an accelerating proliferation of new materials for shoes.

In order to sell their new shoe-material products in this competitive environment, the chemical giants will carry on very powerful consumer-advertising programs like Du Pont's CORFAM advertising program. A major marketing strategy will be to force shoe manufacturers to accept the new materials, by creating consumer demand so strong that the individual shoe manufacturer cannot afford to resist using the material.

The chemical companies will be motivated to sell more new chemical products to the shoe industry, but will have no motivation to protect the shoe manufacturer's present production-equipment investments. The chemical companies will not be bound by traditional shoe-construction and traditional shoe-production methods. Indeed, they will be inclined to develop new shoe constructions and new shoe-production methods that will make their new materials more useful and that will thereby increase their materials sales.

Materials Research and the Shoe Manufacturers. The nature of materials development demands very sophisticated chemistry and other advanced technical capabilities. This business is foreign to the shoe manufacturers, and they should not attempt to compete directly with the chemical companies in this area. And there really is no need to compete: the competition among the chemical companies will guarantee a very rapid flow of new shoe materials.

But, the shoe manufacturer will have to develop new technical capabilities to successfully compete with other manufacturers in exploiting the new-materials opportunities and to avoid risks of introducing new materials in the wrong ways. The pace of change will be too rapid, and the advantages gained by the leading shoe manufacturers too great, for shoe manufacturers to continue the traditional "let-Joe-try-it-first-and-I'll-watch"

attitude. The consumer-advertising strength of the chemical companies is so great that shoe manufacturers will be forced to rush into use of new materials, with the first in gaining great merchandising advantages.

Testing. The new materials-development environment will present a need and an opportunity in materials testing. The pace of new developments will force the manufacturer to develop a testing capability so that he can keep up with his competitors in use of popular new materials with low risk of making unsatisfactory shoes. Good shoe-materials-testing capabilities will be one important consideration in chemical companies' selection of shoe-manufacturer teammates for joint testing and introduction of new shoe materials. Thus a strong testing capability may help give a shoe manufacturer a major merchandising jump in selling shoes with popular new materials.

Other Research. The chemical companies will also seek, in the shoe manufacturers with whom they cooperate, capabilities to do research on new shoe constructions and new shoe-manufacturing techniques, and they will want their shoe-manufacturing teammates to understand and help with their sophisticated market research and long-range planning programs. The shoe manufacturers who are most capable in these areas, as well as in materials testing, will be the companies that gain major competitive advantages through cooperation with the powerful and innovative chemical giants.

International Competition

Since World War II, European shoe industries have emerged as strong competitors for United States manufacturers, in shoe sales and in shoe technology. As a result, United States manufacturers are forced to consider improved technology. They are also presented new opportunities through new European shoe technology.

Development of European Shoe Technology. The dominant original cause of Europe's rapid advances in shoe technology was World War II. On the one hand, the War destroyed factories for shoe manufacturing, shoe-machinery manufacturing, and shoe-materials manufacturing. On the other hand, it accelerated technical progress, providing new tools for better shoe manufacture. The destruction wrought by the war presented a need to rebuild and destroyed traditional methods and traditional industry structure.

In the rebuilding, new equipment had to be purchased in abnormally high quantities. This, plus the new technology emerging from the War, permitted the European shoe industries to become much more modern than they otherwise would have been. And United States financial aid, particularly through the Marshall Plan, increased European industries' ability to finance purchase of new equipment.

European shoe manufacturers thus were provided an opportunity to see the payoff in new technology; they were impressed, and so encouraged development of strong individual-company and cooperative shoe-research programs to continue the flow of benefits from new technology.

Shoe-industry research today in Europe is impressive. Appendix B, outlining the research programs of two leading European shoe manufacturers, and Appendix C, on

SATRA, show that some European shoe-research programs are ahead of any in the United States. This is not to say that Europe is ahead of the United States in shoe research – it is, however, certain that every United States shoe manufacturer, and the United States industry as a whole, can gain a great deal from study of European shoe research.

Effects on United States Shoe Manufacturers. In fact, the United States shoe manufacturers must accelerate their technical competition with European shoemakers. With Europe's lower labor costs (particularly in some countries) and style leadership, European shoemakers have been able to gain more and more of the United States shoe market. For United States manufacturers, the most promising way – probably the only way – to counter this competitive threat is through technological leadership. American shoe manufacturers must develop the capability to adopt new European shoe technology (such as new machinery) quickly to minimize European competitive advantages, and must originate new United States shoe technology to offset Europe's cost and style advantages.

Some excellent activities along this line are already underway in the United States shoe industry. The Annual Footwear Management Conference and Exposition, sponsored by NFMA in cooperation with Shoe Manufacturers Association of Canada, has become an excellent source for United States manufacturers of information on both United States and European new machinery and production techniques. Assisted by the trade associations in many cases, increasing numbers of United States shoe manufacturers are visiting Europe's leading shoe technology and shoe-manufacturing centers. To maintain leadership, United States shoe manufacturers will have to participate more and more in this kind of activity.

Changing United States Shoe-Industry Attitudes

The shoe manufacturers – at least the leading manufacturers – know about these changes taking place and recognize the rapidly growing needs and opportunities in research. Several of the leaders have already moved into research and made considerable gains. Appendix A presents a review of some of these accomplishments.

However, the research programs of the leading shoe companies are today more significant for what they indicate about the future than for what they have accomplished to date. They reflect a growing appreciation among shoe manufacturers of the needs and opportunities in research and of the new importance of research in competition among shoe manufacturers and in the health of the whole industry.

The new attitude toward research in the shoe industry is, fortunately, much more widespread than today's shoe research. The leaders in shoe research are of course most aware of the new needs and opportunities – but, among many companies throughout the industry, there is a new attitude toward research. Shoe executives in many of the companies visited by Battelle described the change, pointing out that the traditional concentration on style and merchandising and neglect of technology is giving way to a new emphasis upon plant modernization and manufacturing efficiency, use of new materials, and new methods of shoe construction, along with style and merchandising. They expressed the opinion that shoe manufacturers must do more in these areas. Table 2 contains the published comments of several shoe executives, which demonstrate the "new attitudes".

TABLE 2. EXAMPLES OF CHANGING ATTITUDES OF SHOE EXECUTIVES TOWARD RESEARCH

"This fast-moving world and our inability to compete in world markets as an industry has been responsible for awakening the American shoe manufacturer to the need for greater efficiency, methods, and procedures that will result in lower costs."

- Mr. T. R. Volenetz
Vice-President of Manufacturing
Brown Shoe Company

"In the old days the executives knew technology – they came up through the ranks, worker to foreman to executive. Today, you need engineers, plant engineers for plant layout, and others for technological improvements which must be investigated and tried out."

- Mr. Harold O. Toor, President
Freeman-Toor Corporation

"There is no question that the shoe industry is on the threshold of many great and far-reaching changes in materials, in technology, in distribution – long-lived concepts and habits are being shunted aside to make way for the new dynamism of the sixties. I believe our world of shoemaking and distribution will see more change during the next decade than it has in the past century."

- Mr. E. G. White, President
Endicott Johnson Corporation

Equally important – and another indication of shoe manufacturers' desires to move ahead through new technology – is the new spirit of cooperation in technology among shoe manufacturers. Shoe executives point out how different this attitude is from past attitudes and suggest its importance in developing and gaining from new shoe technology.

Recent failures in attempts to organize cooperative research show that the attitude problem is not yet fully solved, however. The new attitude is not uniform throughout the industry. There are shoe manufacturers – including some of the largest – who still feel that they have no need or use for in-company research; this is reflected in a comparison of the case studies in Appendix A. Many of the companies, including some of the research leaders, question the wisdom of participating in cooperative research.

Nevertheless, shoe-industry attitudes have swung sharply toward research and cooperation. Today's shoe-industry attitudes present an adequate basis for dramatic improvements through research.

Research Needs and Opportunities

Research in the shoe industry can be defined under five areas, essentially as listed below:

(1) Machinery

(2) Materials

(3) Shoe constructions

(4) Fit

(5) Style and market research.

In assessing needs and opportunities for research in the shoe-manufacturing industry, it is useful to use this breakdown.

There is, however, another area of consideration in research for shoe manufacturers: development of the company's capability to use shoe-research results developed outside the company. This is not really an area of research, but it should precede research. Development of the ability to use outside research should therefore be the first item on the list of research possibilities.

In looking at the areas of research for the shoe industry, it is necessary to identify:

(1) The needs and opportunites in each area; and

(2) The extent to which this research will be done for the shoe industry by outsiders.

Then, by pinpointing the areas where needs and opportunites are high but outside help will be inadequate, it is possible to identify the areas where research by shoe manufacturers – individually or cooperatively performed – is most needed and most promising.

Company Capability to Use Results of Outside Shoe Research

As suggested above, the development of capability to use outside shoe research – and the subsequent use of such research – is the first step for a shoe company in the research area. A great deal of information on shoe technology is already available to the shoe manufacturer from various sources: (1) periodicals such as the NFMA Technical Journal, Boot and Shoe Recorder, and Footwear News; (2) trade associations such as NFMA and NESLA; (3) leading United States and foreign shoe companies, who are often willing to discuss their technical progress; (4) shoe materials and machinery suppliers; (5) foreign sources, such as SATRA, shoe manufacturers, and shoe-machinery manufacturers; and other sources. It requires considerably less time and investment to use some of this technical information than to originate and apply new research results. Thus use of some of this outside technical information is the natural first step.

However, some of the outside shoe research results are more complex and require considerable in-company technical capability for effective use. The ability to use outside technical information is therefore greater for the shoe manufacturers with the most advanced in-company research capabilities, and the research leaders will always be the most effective at use of outside information, as well as internal research results.

Obviously, the ability to apply outside technical information in a company depends upon the individual company.

Machinery

The emergence of new technologies for solution of traditional barriers to shoe automation, the change in structure of the United States shoe-machine industry, and the accelerating rate of shoe-machine development in Europe combine to offer the shoe industry major new opportunities to automate shoe manufacture, thus reducing labor costs, increasing shoe productivity, and improving competitive strength in the world marketplace. The ways in which these changes have opened new opportunities were described earlier.

It was also pointed out that these changes put a far greater machine-development burden on the shoe manufacturers. The new environment forces reduced dependence on USM. It opens the door to competition among shoe manufacturers in shoe machinery development, an area where they have competed little in the past. Inevitably, competition will increase as the leaders move ahead and other companies are forced to compete to survive. Automated manufacture of shoes is the best long-term answer for the whole industry to increasing competition from countries with lower labor costs.

It appears at this point that the shoe-machinery industry will not become strong and competitive quickly. Present shoe-machinery manufacturers other than USM are small and specialized, and large companies in other industries that have examined the shoe-machine business have decided against entrance. Chemical companies with new shoe materials will undoubtedly do some shoe-machine research, but this will be limited to what is required to develop markets for their new materials. USM has the capabilities and may well have the economic incentive, and is the only potential developer of major new programs for automated shoe manufacture on the horizon today. But the delicate antitrust situation probably makes the unpredictable risk of court action too great for USM to move forward toward shoe automation. The antitrust situation makes the whole area of shoe-machine development impossible to predict. Therefore, the shoe manufacturers themselves will probably have to play a major role in United States shoe-machine research.

There are various levels of shoe-machine research to be performed, ranging from improvement of present machines in one factory to development of radically new methods for industry-wide automated manufacture of shoes. The more specific and less radical improvements are in most cases appropriate for individual-company research, although some cooperative research on improvement problems common to several companies would be appropriate too.

Development of major new methods for automated shoe manufacture is in general beyond the financial means of even the largest shoe manufacturers, however. Research

in this area is most appropriate for cooperatively sponsored research. All the sponsors would gain; probably each would gain more from a larger joint program than from a smaller in-company program. The companies with the strongest research capabilities could retain their competitive advantage through quicker and more effective use of the results.

Because annual labor costs of the shoe industry are high – about 25 percent of $2.6 billion, or $600 million, each year – machinery research leading to productivity increases can provide large savings. The potential gain to the industry from research on machinery and production is suggested in Figure 3, where the annual dollar savings to the industry from various percentage increases in productivity is graphed. An increase in productivity of only 5 percent would, other things remaining equal, save the industry $30 million every year! It is very likely that the total research program required to boost productivity 5 percent would be considerably below this annual dollar savings figure – in which case the investment would provide the industry a return of over 100 percent. And higher research expenditures could probably increase productivity considerably more than 5 percent.

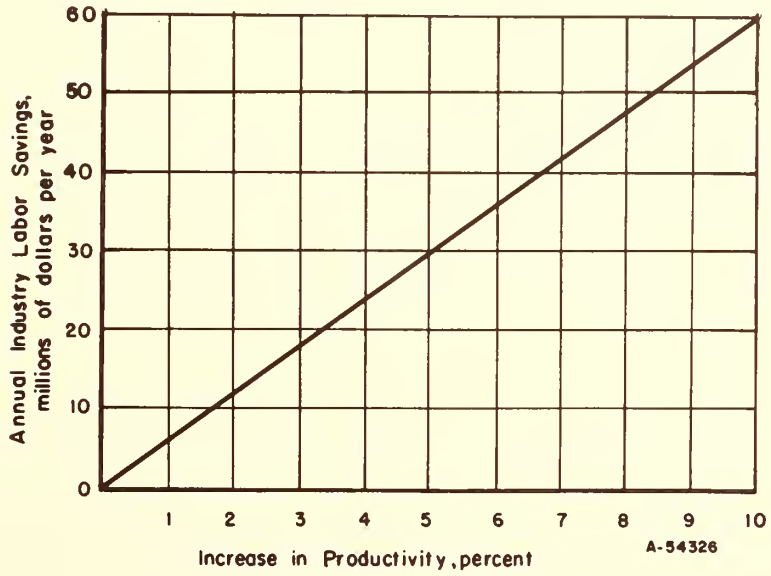

FIGURE 3. ANNUAL INDUSTRY SAVINGS FROM VARIOUS PERCENTAGE INCREASES IN PRODUCTIVITY

The point intended here is not to suggest that exactly $30 million should be spent in this area, or that it would provide exactly 5 percent increase in productivity or exactly $30 million in savings, but rather that shoe machinery and production is an extremely promising area for research, because only a very small productivity gain produces very high dollar savings. In Battelle's opinion, even a research program of moderate results in this area would provide very good return on investment, and a highly successful program would provide an overwhelmingly good return.

With this magnitude of savings potential, the area of machine and production research certainly warrants considerable industry investment. A research investment of tens of millions of dollars on machinery and production processes would be very profitable even if it increased productivity only a few percentage points.

Materials

In the shoe-materials area there are three types of research shoe manufacturers might perform: (1) materials development, (2) materials testing, and (3) cooperative research with outside developers of materials. With the coming of the chemical giants into the shoe-materials area, as described earlier, the required research role of the shoe manufacturer changes.

Materials Development. Traditionally, the shoe manufacturers have depended upon a competitive and innovative supply industry for new materials development, although a few new materials and components have been originated by shoe manufacturers. The entrance of Du Pont and other large chemical companies into shoe-industry supply makes this reliance on the supplier even more appropriate for new materials development. Shoe manufacturers cannot possibly compete with these companies in materials development, and the intensified competition among chemical companies insures that they will not need to – new materials will appear faster and faster.

Testing. But just the opposite is true in materials testing. The traditionally widespread practice of depending upon (1) suppliers' fear of selling poor materials and (2) other shoe manufacturers' pioneering use of new materials will not suffice. The primary reason that this policy will no longer work is that shoe manufacturers will be forced to adopt materials much faster because of powerful consumer advertising of new materials by the chemical companies. Some manufacturers will be able to gain large merchandising advantages with fast introduction of consumer-demanded new materials – backed by shoe-manufacturer testing, and by cooperation with the chemical companies in development of the material. And the other manufacturers, faced with a choice of merchandising loss or quick introduction of new materials without testing unless they develop the ability to test new materials, will be forced to test.

There will be so many new materials, with so many potential uses in the complex shoe industry, that no materials manufacturer will be able to guarantee every manufacturer's use of each new material.

Membership in SATRA, or possibly formation of a United States cooperative shoe-industry testing program, can provide all shoe manufacturers with valuable help in this increasingly complex area, as SATRA now does for the non-United States shoe manufacturers. Participation in a joint industry testing program is recommended. But this will not fulfill all the testing needs of the shoe manufacturers either, for the same reason that the materials manufacturer cannot fulfill all testing needs. There are too many different types of shoes, and new materials will emerge too fast, for a cooperative testing program to provide each manufacturer all the information he will need at the time he needs it.

To maintain and improve his competitive position in the new shoe-materials environment, the individual shoe manufacturer will need an in-company testing capability too.

Like machinery research, materials testing offers very high potential returns because it relates to a very high industry cost. The basic purpose of testing is to insure use of the best materials at the lowest cost. Since materials costs are roughly half of total shoe production costs, or about $1.3 billion per year, a reduction of

materials costs of only 2 percent (which is very reasonable to expect from testing) would save the industry $26 million every year. Figure 4 shows dollar savings to the industry from various percentage reductions in materials costs.

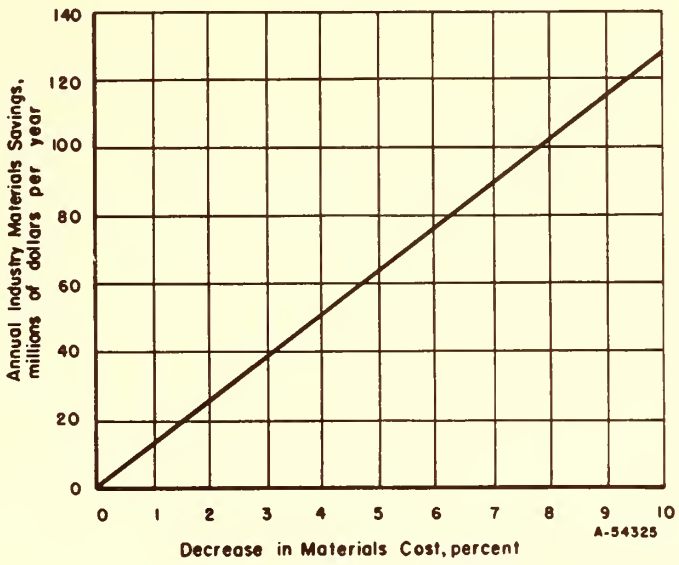

FIGURE 4. ANNUAL INDUSTRY SAVINGS FROM VARIOUS PERCENTAGE DECREASES IN MATERIALS COSTS

Such potential savings make testing a very deserving area for increased shoe-manufacturer investment. It would be highly beneficial to spend tens of millions of dollars on testing, if materials costs were reduced only a few percentage points.

Other Materials-Related Research. As suggested above, the large chemical companies entering the shoe-materials business will seek help from leading shoe manufacturers in testing materials appropriate for shoe manufacture. This cooperation will provide benefits to both parties: the chemical company will gain from the shoe manufacturing and merchandising knowledge of the shoe manufacturer, and the shoe manufacturer will gain a valuable lead in reaching the market first with materials in great demand because of chemical-company advertising.

For the individual shoe manufacturer there are major opportunities in cooperating with chemical companies, and there will be competitive losses for those who don't.

In choosing a shoe-manufacturing partner, the chemical company will look for several research capabilities including, but not limited to, testing. Among other capabilities sought will be shoe machine development and new construction development – to help in applying new materials to shoe manufacture – and styling and market research capabilities, to plan and assess successful retail introduction. The chemical company will seek a shoe manufacturer with modern overall research and planning capabilities so that the partners can speak the same language.

This is not by any means the only reason why shoe manufacturers should build up these research capabilities, or the only way in which they will pay off. But, because of the great technical and promotional strengths the chemical companies will bring to

shoes, the opportunity to cooperate with the chemical company will be a major payoff from research for the leading shoe manufacturers.

Shoe Constructions

Research on shoe construction – the ways a shoe is put together – is in many ways the meeting ground between materials research and machinery research. The central task in construction research is to find new ways of putting together better shoes more economically, using materials and machines. Because the shoe-construction area of research is so directly related to materials and machinery, it too is directly affected by changes in the materials and machinery environments. The entrance of the chemical giants into shoe materials and the new technical capabilities and new industry structure in machinery will result in faster development of new shoe construction.

In the area of shoe construction, materials suppliers will certainly perform research. But this research will be aimed toward developing and increasing markets for their particular materials, rather than toward increasing shoe manufacturers' profits. It will be focused much more on use of new materials than on use of new machinery technology and will not necessarily lead toward the kinds of automation the shoe industry can best use. Thus, shoe-construction research of materials suppliers will not fill all the needs or tap all the opportunities for shoe manufacturers.

To supplement the shoe-construction research of materials suppliers and provide a balanced overall research effort serving the best interests of shoe manufacturers, the shoe manufacturers will have to perform shoe-construction research along with their machinery research. This will blend nicely with the machinery research. Given new materials and the existence of new machine technologies, the overall task will be to find new construction and machine ways of producing better shoes more efficiently and economically.

Along with shoe-machine research, shoe-construction research will range from minor improvements to radical new concepts. It will be appropriate for the individual companies and for cooperative groups to perform minor-improvement construction research along with minor machine-improvement research. (Several shoe manufacturers have already shown a great deal of ingenuity in this area.) The larger, more radical new construction research efforts will for the most part only be possible through cooperative research, in combination with the larger group programs for new-machinery research.

Fit

Shoe fit is an extremely complex subject – so complex that there is no generally accepted precise definition of fit. From the shoe manufacturer's viewpoint, fit is best measured by consumer acceptance, and consumer acceptance involves a complex network of factors ranging from shoe and foot size and shape to psychological effects of style.

Past research on shoe fit in the United States has been sparse and spotty. The United States Army's Fort Knox study of men's feet was the only large-scale United States foot-measurement program; this study and the University of Rochester's small

continuing study of feet in motion are virtually all that has been done in the United States on foot measurement research. This has hindered scientific advancement in shoe fit, since such advances would have to be based on foot-measurement data. But Government has shown new interest in performing more research on foot measurement. The United States Department of Agriculture has recently sponsored research on a foot-measurement machine.

Research on shoe shapes and sizes has also been limited. United Shoe Machinery's development of the Geometric Last-Grading System, which is designed to facilitate automation while retaining the present size system; Genesco's development of the DFC Last-Grading System, which is designed to reduce inventories while retaining good fit; and Endicott Johnson's sponsorship of shoe-shape research at the University of Rochester have been the major company-sponsored programs. A Federal Trade Commission decision limiting advertising on fit has tended to smother research of the type Endicott Johnson sponsored, and apparent conflicts between the Geometric System and Genesco's DFC have prevented widespread industry adoption of either system.

Nevertheless, research designed to improve shoe shapes and shoe-size systems can affect consumer satisfaction, shoe inventories, and automation. The Battelle report on last-grading of men's shoes, which recommends a compromise last-grading system designed to provide the benefits of both Geometric and DFC, shows a net gain to the industry of about $30 million from a new system just for men's shoes. Similar gains may be possible in women's and children's shoes.

Expenditures of the shoe industry for fitting of consumers, and of consumers to overcome fitting problems, are in billions of dollars annually. Obviously, research leading to improved fit may provide high economic return through reduction of these expenditures. And changes in shoes and lasts to increase automation may provide very large savings in shoe production.

Research on shoe shape, as well as research on women's and children's sizes, requires development of new basic data on foot measurement first – and development of such data will probably be costly. However, there is a good reason for government to be interested in foot measurement too: the problems of foot health. And there is evidence of government interest in sponsoring research on foot measurement.

It appears appropriate that government and industry cooperate in sponsoring research on fit. The first two steps in such research should be (1) foot measurement (Government); and (2) exploratory research to estimate payoff from various areas of shoe size and shape research and to identify the most promising research areas (industry).

Style and Market Research

Development of new styles has been one of the critical areas of competition among shoe manufactures and thus has not been an area of cooperation at all. Each company's style development has been the company's secret – even if his styles are copies of his competitor's latest successful style. This obviously will not change.

But there are new tools and techniques for market research that can help shoe manufacturers to plan and select styles more successfully. In addition, use of these

tools can help individual manufacturers and the industry as a group to plan and guide cooperative research efforts in the most promising areas. A third benefit to the individual manufacturer from knowledge of market research will be improved capability for cooperative research with chemical companies in development and introduction of new shoe materials.

The chemical companies have entered the shoe supply industry armed with powerful capabilities for consumer market research, and will provide shoe manufacturers some valuable data – as Du Pont has already done in its CORFAM program. But, as with all shoe research done by materials suppliers, these companies' market research will be focused on sale of new materials rather than on sale of a particular manufacturer's shoes. It will provide shoe manufacturers with valuable data and demonstrate the potential of good market research, but it will not answer shoe manufacturers' specific market research needs and opportunities.

Shoe manufacturers can gain a great deal from market research through a cooperative program. A lot of market information is of value to many companies and need not be proprietary, including national and regional size-width profiles, and changing overall style preferences. Cooperative continued development of such market information can help every company, at little cost to each, while permitting continued styling competition. The industry has already done some cooperative market research, but there are opportunities to gain from more of this research.

The larger individual shoe manufacturers can also gain from increased in-company market research for early identification of style preference changes.

As increased influence of chemical companies and increased shoe research provide greater needs for market research, and as new tools and techniques permit more effective market research, the needs and opportunities in cooperative and individual-company market research will grow.

The New World of Shoe Research

A summary chart of the areas of shoe research is shown in Table 3, outlining for each research area:

(1) The needs and opportunities;

(2) The research help the shoe manufacturers can expect from outside the industry; and

(3) The research shoe manufacturers should do.

The preceding discussion covered this table row by row, by area of research. But it is also informative to look at this table by column.

In the research-needs and opportunities column, the effects of the changing shoe-research environment in opening research doors, as described in Section A, is summarized.

Analysis of the columns covering shoe research likely to be done for the industry by outsiders shows clearly the powerful effects on the industry's research that the chemical companies will play. They will provide the industry with a very rapid flow of

TABLE 3. SHOE-RESEARCH NEEDS AND ROLES, BY AREA OF RESEARCH

Area of Research	Research Needs and Opportunities	Research Likely To Be Performed by Others for Shoe Industry			Research That Must Be Performed by Shoe Manufacturers
		Materials Suppliers	Machinery Suppliers	Government	
(1) Capability to use outside shoe-research results	Required of each company to exploit available outside information on new shoe technology. Leaders in this area will gain most from research done outside industry or cooperatively.				Must be developed by individual shoe manufacturer.
(2) Machinery research	New technologies of other industries, new structure of U. S. shoe-machinery industry, and expanding new European shoe-machine technology are increasing shoe-manufacturing-technology competition and presenting new needs and opportunities.	Materials suppliers will participate in shoe-machine development only to the extent necessary to develop markets for their new materials.	Machinery suppliers working on shoe-machine development may not be large and strong enough, or may not have incentives, to develop full potential for automated shoe manufacture.		Shoe manufacturers should play leading role in development of new shoe machinery. Because of the structure of the shoe business, they may be the only companies with strong incentive to automate manufacture of shoes.
(3) Materials research	New Poromeric technology and new interest of chemical companies in shoe material market creates new materials research needs in shoe industry. Leaders in testing and in cooperation with chemical companies will gain merchandising leads.	Materials suppliers, particularly the large chemical companies, will dominate development and promotion of new shoe materials. They will work with leading shoe manufacturers in some phases of development and testing.			Shoe manufacturers will neither be able to nor need to compete in materials development, but will have to increase testing and other research capabilities to exploit new materials quickly.

TABLE 3. (Continued)

Area of Research	Research Needs and Opportunities	Research Likely To Be Performed by Others for Shoe Industry			Research That Must Be Performed by Shoe Manufacturers
		Materials Suppliers	Machinery Suppliers	Government	
(4) New Construction Research	Combination of new materials environment and new machine environment opens doors to construction improvements and radically new constructions.	Both materials suppliers and machinery suppliers will work on new shoe constructions, and each will work in cooperation with leading shoe manufacturers in development and testing.			Shoe manufacturers will face needs to increase capabilities in testing and other research areas, to cooperate with materials and machinery manufacturers, and to get the jump on competitors in introducing new shoes.
(5) Fit Research	Fit research in U. S. and abroad, and indications that more foot-measurement data will be developed, both permit and illustrate the payback from more research on fit.	Materials suppliers will perform some research on shoe sizes and shapes, to the extent necessary to develop markets for new materials.		Government might sponsor new research on measurement of feet, for health and economic reasons.	The shoe industry will have to perform the research leading to better sizing systems and improved shoe shapes.
(6) Style and Market Research	New methods of scientific market research, new computer uses in market research, and use of sophisticated market research by chemical companies in shoe industry present new needs and opportunities.	Materials suppliers will perform style and market research for marketing of new materials.			Shoe manufacturers will be forced by competition, and by need to cooperate with chemical companies, to develop new capabilities for scientific market research and planning.

new materials, eliminating shoe manufacturers' needs for research on materials development but increasing needs for testing by shoe manufacturers, and they will perform some research in virtually every area of shoe research: constructions, machinery, fit, style, and market research. In these latter areas, the chemical companies' work will provide only part of what shoe manufacturers want because their purpose will be to sell materials rather than increase profits of shoe manufacturers, but their strength will provide leading shoe manufacturers with very profitable opportunities for joint research with chemical companies.

The machinery suppliers will provide the shoe manufacturers with new shoe machines, but probably will not soon become strong enough to tap the enormous potential for automated shoe manufacture now on the horizon. Government should develop new foot-measurement data, aiding the industry's research on fit.

The right-hand column in Table 3 thus summarizes the areas of research most deserving of shoe-manufacturer attention and investment. There are opportunities in all research areas: machinery, materials, constructions, fit, style, and market research.

Among these areas, testing and machinery research appear to offer shoe manufacturers the greatest needs and opportunities. In both of these areas, economic savings from research can be high, and in both areas the shoe manufacturers must play a leading role. The payoff and time-to-payoff of research in these areas are summarized in Table 4. Testing and production-process-improvement research can help all shoe manufacturers, but development of radically new machinery and production processes will help only the larger and more advanced companies.

The payoff from testing comes through better use of the right materials at lower cost. It was shown earlier that only a small percentage reduction in materials costs leads to savings in the tens of millions of dollars for the industry – and the savings to the individual company are very high too. For example, a manufacturer now earning 4 percent on sales can increase profits 50 percent just by reducing materials costs 4 percent.

A second reason that testing is an attractive investment is that it offers quick results. Testing activity can be established in a relatively short time and does not require very advanced technical capabilities, and testing can lead to reduced materials costs in only a few months.

Machinery research also offers high economic gain. It was shown earlier that only a small percentage increase in productivity can save the industry tens of millions of dollars. For the individual company now making 4 percent profit on sales, an 8 percent productivity increase will increase profits 50 percent.

In the machinery area, there is some research that can provide a short-term payback, and other research that would involve a longer-term return. Research on today's shoe-making processes, designed to achieve improvements in efficiency and productivity of these operations, could probably provide significant economic benefits in 1 or 2 years.

TABLE 4. PAYOFF AND TIME FRAME FOR TESTING AND MACHINERY RESEARCH

Area of Research	Payoff		Time Required to Payoff	Companies That Can Gain Significantly From This Research
	Entire Industry	Individual Company (With 4% Profit on Sales)		
Testing	2% reduction in materials costs provides $26 million savings every year	4% reduction in materials costs provides 50% increase in annual profits	Less than 1 year	All
Machinery (and Production Processes)	5% increase in productivity provides $30 million savings every year	8% increase in productivity provides 50% increase in annual profits	(1) Improvements on present production processes: 1 or 2 years	All
			(2) Radical new shoemaking processes: several years	Leaders

Research designed to develop radically new methods for automated manufacture of shoe would not pay off so quickly, but research in this area offers the most promising long-term gain to the shoe industry – particularly to the leaders. With the very rapid advances in technology in other United States industries, there are several promising approaches to automated shoe manufacture; and such automation can put the United States leaders far ahead of other United States shoe manufacturers and far ahead of all foreign manufacturers.

SHOE-INDUSTRY RESEARCH: HOW NEW CAPABILITIES CAN BE DEVELOPED

There are several ways in which the shoe industry can develop new research capabilities to exploit the new opportunities, individually and cooperatively. And differences in present research capabilities among shoe manufacturers will call for different research strategies. A review of the present situation regarding shoe-manufacturer research and the alternative ways of developing new research capabilities is required to identify the best research strategies today for companies and for the industry.

U. S. Shoe-Industry Research Today

Industry Structure

It is estimated that 630 million pairs of leather and "leather-type" footwear will be produced in 1965 by approximately 850 manufacturers. The top 80, or 9 percent of the companies, account for approximately 62 percent of the total shoe output.* The distribution of shoe output among the 80 top manufacturers is shown below.

Group	Share of Industry's Total Output, percent
Top 5	24.6
Top 10	31.5
Top 20	40.2
Top 50	54.0
Top 80	62.1

Among the top 80 firms according to dollar sales, 14 are general line producers of men, women's, and children's shoes; 30 are makers of women's shoes; 9 are men's shoe manufacturers; 6 are makers of children's shoes; and 3 are makers of men's and women's shoes. It is interesting to note the rapid drop in size from the largest shoe manufacturing company, International Shoe Company, with 1964 sales of almost $296 million, to the 80th largest, Milton Shoe Manufacturing Company, with 1964 sales of about $6 million. From these figures it is quite apparent that the shoe industry is unlike many other United States industries in that it is not dominated by a small number of large companies.

*Rossi, William A., "Top 80 Shoe Manufacturers in 1964", Boot and Shoe Recorder, April 15, 1965, p 51.

Among the 850 or so shoe manufacturers, an estimated 250 to 350 are "brand manufacturers" who produce for their own labels, and the other 500 to 600 produce primarily for large distributors with distribution brands. Typically, the brand manufacturers are more financially stable and more interested in the future health of the industry. Most of these firms are members of NFMA, the national trade association. On the other hand, the unbranded manufacturers are in a type of business that makes most of them unwilling to spend any money for longer-range cooperative activities.

Most shoe manufacturers are privately owned and do not publish a public financial statement. It is estimated that only two-thirds of all shoe companies report profits. However, because of the differences in accounting systems, it is difficult to compare a privately owned company with a publicly owned one. Management salaries, liberal expense accounts, and fringe benefits vary considerably between companies. As a result the true profit picture of the shoe industry is obscure. Approximately 30 to 40 bankruptcies occur each year in the shoe industry and about 30 to 40 new companies are formed.

Professor Harry W. Hanson has described management in the shoe industry as "more a way of life than an economic sensibility".

Industry Research

With respect to in-company research, the United States shoe-manufacturing industry is divided into two groups:

(1) The research leaders, a small group of larger (although not necessarily all the largest) companies with research programs of varying strength

(2) The others – all other shoe-manufacturing companies, who rely on their suppliers for all research and technical improvement.

Appendix A outlines case histories of four large shoe-manufacturers' research programs; the first case typifies "others", and the last three describe programs of three leaders.

Among the leaders – a group comprising not more than ten United States companies – present research programs range from a single engineer "jack-of-all-trades" to a separate department with several engineers and technicians. Research activities range from just review and use of outside literature and new developments on the one hand, to extensive materials testing, machine development, construction development, fit research, and market research on the other. Wolverine and Brown probably have the most advanced research programs in the United States shoe industry today; these two companies' programs, and the gains that have emerged from the programs, are described in Appendix A.

The wide variation of research strength among the leaders prevents neat classification of research capabilities of this group, and the most appropriate next step in research will not necessarily be the same step for all the leaders. But this small group does represent a significantly different situation from that of the other companies: the leaders are now capable of using some results of outside shoe research and have a good start on research within the company.

Among the other 800 or so shoe manufacturers, there is virtually no research capability today.

More than one attempt to ignite the beginnings of cooperative shoe manufacturer research has been launched in the past few years, but no real results have appeared to date. In 1958, several shoe manufacturers formed a technical committee under NFMA with the intention of creating a cooperative testing program sponsored by shoe manufacturers and shoe suppliers, but the attempt failed for lack of company contributions. In 1962, Mr. H. C. Levy, now President of Prestige Shoe, was active in a program to standardize nomenclature and dimensional definitions of shoe components on an industry-wide basis, but this program also failed because of lack of cooperation among shoe manufacturers. Other cooperative programs to standardize terminology have also failed, although NESLA now has such a program that is focused on lasts. Both NFMA and NESLA have issued literature designed to encourage and aid shoe manufacturers in testing.

It appears that there is growing interest in cooperation in testing – testing must begin with standardization of terminology and dimensional definitions – but recent failures suggest that the road to cooperative research is not yet clear. Some shoe manufacturers seem to hold a lingering confusion regarding standardization.

Alternative Ways of Developing Shoe-Research Capabilities

There are several different ways in which individual companies and the industry as a whole might approach new and increased research. The ideal answer for the individual company will depend on its present research capability and size and on other company factors, and the industry's answer will depend largely upon attitude changes now taking place.

Individual-Company Research

The individual shoe manufacturer's development of research capabilities should follow a two-phase sequence, as shown in Table 5. The first phase, use of available outside shoe technology, requires only a low in-company technical capability and a modest investment, and offers the most for the least at the outset. It is the logical first step in improving company use of new technology. An improved profit situation could result on a short-term basis.

The first step in using outside technical information must be development of in-company capability to apply outside research results. Typically, this will require establishing a formalized research function, hiring of an engineer, and introducing him to the company's present products and methods – although some companies that are not now using outside research results may have the right man on hand. An alternative technique would be to use a consultant; but this has the disadvantage of leaving the company itself very weak in knowledge of new shoe technology unless a good inside man works closely with the consultant. For very small companies it may present the most attractive solution.

TABLE 5. DEVELOPMENT OF RESEARCH CAPABILITIES BY INDIVIDUAL SHOE MANUFACTURERS

	Major Steps		Key Elements in Step	Estimated Minimum Cost
I.	Use shoe technology now available outside	A. Develop ability to evaluate and use in-company the results of some outside shoe technology	• Hire engineer – make him familiar with company products, factory, materials	$20,000/yr
		B. Develop access to available outside shoe technology	• Join SATRA • Visit leading U. S. and European shoe manufacturers and suppliers • Study industry literature	$250/yr or more, depending on company size[a]
II.	Develop new shoe technology inside company	A. Develop ability to perform testing	• Establish test standards • Purchase test equipment • Hire testing technician	$5,000 – $30,000 $15,000/yr
		B. Develop ability to improve factory: layout, conveyorization, minor machine improvements	• Hire industrial engineer	$20,000/yr
		C. Develop ability to perform more sophisticated shoe research: machinery development, new construction, fit research, market research	• Add engineers, technicians research facilities	$50,000/yr

(a) SATRA membership fees are computed at $2. 50 per production worker per year.

The second step in using outside technical information on shoes is to study the available information. There is available today a great deal of information on shoe technology that can help the manufacturer who is not now a research leader. SATRA membership will provide the company with a great deal of useful information, particularly in the areas of testing and production-process improvement. Materials suppliers and machinery suppliers (including European companies) can provide the shoe manufacturer with many valuable new ideas and new products and help him use them. Some of the leading shoe manufacturers are willing to discuss openly some of their technical advances now unknown to most shoe companies. NFMA, NESLA, and industry literature offer useful technical aid.

All these sources provide the shoe manufacturer now doing no research the opportunity to gain a great deal of technical information that can be turned into profit without extensive in-company research.

Phase II in individual-company shoe research involves development and exploitation of company-originated technical improvement: first testing, then plant engineering, then more sophisticated research in various areas. Development of Phase II capabilities is more expensive, but it offers the opportunities for all the advantages of leadership in the new world of shoe research. The records of Brown and Wolverine illustrate the payoff potential of research investments.

Typically, the first step in in-company shoe research is testing. Standards for tests of incoming materials are established, and then sample testing of regular purchases is carried on. Testing of new materials usually requires more original technical work in definition of the test specifications for each new item, and so comes later.

A logical next step after testing in advancing technical capabilities is engineering analysis and improvement of the factory. The basic requirement here is one or more good, experienced industrial engineers.

Finally, development of capability to perform more fundamental research in various areas of shoe research – machinery, construction, fit, and market research – requires development of a staff of capable engineers, and research facilities.

Most shoe manufacturers have not begun to move into Phase I of shoe research yet. Each of these companies should begin developing technical capability as shown at the top of Table 5. The leaders, however, have already progressed through one or more of the steps. Brown and Wolverine are working on Step 5 now. The companies now doing research can also use Table 5 to assess their progress and chart further advances.

Cooperative Research

As used in this report, the term "cooperative research" refers to research sponsored by more than one company. While it does require pooling of funds and sharing of the results of the research thus sponsored, it does not require, and probably would not involve, sharing of company technical knowledge or of company research manpower and facilities. Thus it does not require that the research leaders "give away" their lead.

Areas where shoe manufacturers might cooperate in sponsorship of research range across a wide spectrum, from just maintenance of an industry information center on publicly available shoe technology, to performance of routine testing, to advanced

fundamental research on new concepts for automated manufacture of shoes. These various areas for cooperative research can be classified by relating them to companies with different research capabilities, as summarized in Table 6.

The companies without in-company research capabilities need cooperative research on less advanced areas of shoe technology because they depend totally on outside technical information. They are not capable of using very sophisticated research, but can gain a great deal from such cooperative activities as maintenance of a shoe-technology information center, establishment of testing standards and methods, testing of new materials, and analysis of factory-improvement methods. Such cooperative research would be of great benefit in helping the larger and medium-sized companies to compete until they have established stronger in-company research capabilities, and it will be needed on a permanent basis by the smaller companies that cannot afford extensive in-company research.

As the shoe manufacturer develops his in-company research program, he will come to depend less on this type of cooperative research. But his gains from cooperative research will grow because his increasing technical capability will permit him to use more of the results of cooperative research faster and more intelligently. Thus, as he moves toward leadership in shoe research, his gains from cooperative research will grow. This is a point some of the leaders in United States shoe research today do not seem to recognize, but leading British manufacturers' assessment of SATRA's value demonstrates that the leaders can gain the most from cooperative research.

Finally, the shoe manufacturers leading in research face a major opportunity to gain further competitive advantage through cooperative sponsorship of much more advanced research. In this way, they can together move beyond the research capability of any individual shoe manufacturer, to exploit applications of sophisticated technology from other United States industries for automated shoe manufacture. The competitive advantage will come from the fact that other companies will not have the technical or financial capabilities to exploit the research results. Advanced information, even though it is shared with competitors, can provide a higher payoff for a technically sophisticated company.

Basically, there are two ways in which shoe manufacturers can achieve cooperative research. One is to join a permanent organization like SATRA created just to do shoe research and the other is to cooperatively sponsor programs with one or more contract-research organizations, either continuously or on an off-and-on basis.

A Permanent Shoe-Research Organization. Because of SATRA's strength and renown in shoe research, that organization immediately comes to mind when one mentions the concept of a cooperative shoe-research organization. In fact, SATRA ought to be investigated carefully in the United States shoe industry's evaluation of alternative methods for cooperative research. Appendix C sets forth in some detail relevant information about SATRA's organization, funding, methods of operation, and achievements.

There are three ways in which United States shoe manufacturers could develop an organization for continuing shoe research; each bears some relation to SATRA. The first approach would be to join the present British SATRA as foreign members; the second would be to prevail upon SATRA to establish a North American branch to better and more directly serve United States (and Canadian) shoe manufacturers; and the

TABLE 6. THE UNITED STATES SHOE MANUFACTURER AND COOPERATIVE RESEARCH

Phase of Company Research Capability	Company Capability to Use Cooperative Research	Company Needs and Opportunities in Cooperative Research
I. Use shoe technology now available outside	Can use simpler new technical information: testing results, some machine improvements and factory improvements, etc.	All Phase I companies need cooperative research in less advanced areas because they depend on outside research; small companies will need this research permanently because they cannot afford company research.
II. Develop new shoe technology inside company	Can use more sophisticated, new shoe technology faster and more effectively as company research capabilities become stronger	As companies increase Phase II capabilities, their dependence on cooperative research will decline, but their opportunities in cooperative research will increase. Being more capable in shoe technology, they will be able to use cooperative research results faster and better than others.
III. Beyond Phase II	Can use radical new technical approaches to shoe manufacture that are far beyond other companies	Larger shoe manufacturers with leading in-company research capabilities can take massive steps beyond other companies by sponsoring sophisticated cooperative research that only they have technical and financial capabilities to use.

third would be to establish a separate United States cooperative shoe-research association along the lines of SATRA and with or without cooperative ties to SATRA.

Whichever of these three alternatives is eventually selected, the United States manufacturers ought to begin by joining the present British SATRA. In this way they can become more familiar with SATRA before making the final decision, and they can resolve some of the difficulties and questions that still stand in the way of United States industry-wide shoe research – such as financing and standardization of nomenclature.

As pointed out previously, joining the present SATRA is an important early step in each United States manufacturer's development of research capability. Therefore, each manufacturer will be serving his own immediate interests, as well as evaluating methods for United States cooperative research, by joining SATRA.

It is not clear at this point which of the three methods for permanent joint shoe research is best for the United States industry. Shoe manufacturers must first come to a realization that it is in the best interests of all companies to have cooperative shoe research, must overcome some of the barriers that have blocked past efforts at cooperation, and must decide what they want from cooperative research.

Contract Research. Cooperative sponsorship of research with a contract-research organization offers shoe manufacturers greater flexibility in governing cooperative research. Any number of companies with a common interest can sponsor a specific program at any particular time, and each company can limit its participation to the research areas and times of its own choosing. On the other hand, on-and-off cooperative research will not provide the same continuous buildup of shoe-research experience that a continuing program would.

Contract research also represents one of several ways in which the shoe manufacturers could create a permanent cooperative United States shoe-research organization.

Government Assistance. Recent legislation has provided the shoe industry with the mechanism for obtaining government technical and financial support. The United States Department of Commerce Voluntary Product Standards Program could be utilized to develop materials and product standards (see Appendix D). Previous efforts of shoe manufacturers have not been successful in establishing even a framework for increased standardization in the industry. A continuous effort supported partially by the Government could provide the stability and technical support to bring about the needed action.

The State Technical Services Act of 1965 provides a mechanism for financing industry research programs on a matching-funds basis (see Appendix D). Such programs as the establishment and operation of a shoe-technology information center and a broad study of shoe productivity could be conducted under provisions of this act.

Matching the Research Approach to the Research Area. Of the various areas in which United States shoe manufacturers could sponsor cooperative research work, four stand out:

(1) Coordination of available shoe-research information

(2) Testing

(3) Machinery and production – improvement of present methods

(4) Machinery and production – development of radically new methods.

The first three of these research programs are of interest to all shoe manufacturers today. They are areas in which British SATRA can provide considerable help, and in which cooperative research can probably best be accomplished through some mechanism patterned after the present SATRA. Therefore, the most appropriate way to approach cooperative research in these areas is to (1) join SATRA now, and (2) subsequently decide whether to seek a North American branch of SATRA, establish an independent SATRA-like organization in the United States, or just continue to depend on British SATRA.

The fourth outstanding area of opportunity for cooperative research – development of radically new shoe machinery and production processes – is not of interest to all United States shoe manufacturers today. Most have neither the technical nor the financial capability to exploit the results. Nor is this an area in which the present SATRA can provide the answers. SATRA has not done much in this area, and no foreign organization has the exposure to new United States technologies in other industries that should be the basis for this research.

It is therefore appropriate that the several leading United States shoe manufacturers who can gain from such research cooperatively sponsor research on radical new shoe-making procedures through a contract-research organization familiar with the new United States technologies and with the shoe industry. This program should be separate from the industry-wide SATRA program and should begin now.

What Should Be Done

With all the preceding information in mind – the revolutionary changes in the shoe-research environment, the new needs and opportunities in shoe research, the various ways of creating new research capabilities – what should the shoe manufacturers do next? The answer to this question is different depending on company size and present status of technical capabilities.

The Leaders

The research leaders presently have a strong competitive advantage over other shoe manufacturers. Their strategy should be aimed at holding and increasing the advantage — to keep the lead in introducing new materials, manufacturing shoes more efficiently, and generally exploiting the advantages of investment in technology.

Toward this end, the first target of each of these companies should be to increase its in-company research capability by progressing through all the steps indicated earlier in Table 5 and by expanding research strength above minimum in each step, particularly in the more advanced Step 5 research.

The second major target of each leader – again, something to pursue individually for the most part – should be increased cooperation with the chemical giants moving into shoe-industry supply, to gain the valuable research information and merchandising leads that will result from such joint work.

The third research target should be to encourage and support all efforts of United States shoe manufacturers to establish cooperative research. The benefits received by each company from cooperative research will be determined not only by what cooperative research is done but also by the individual company's ability to use the research results. Thus the United States leaders, having the strongest and most sophisticated in-company research understanding, will inevitably be able to use more results of cooperative research and use them more quickly and more intelligently.

The fourth research target of leading United States shoe manufacturers should be to cooperatively sponsor research aimed toward radical new approaches to automated shoe manufacture through application of new technologies developed in other United States industries. This fourth target will not provide as quick a return as the others, but over the longer term it offers the greatest opportunities to move far ahead of even the most advanced foreign shoe manufacturers. The United States leaders have the opportunity to exploit their technical and financial superiority in such ways that the laggards just won't be able to compete; and, through use of new technologies from such advanced United States industries as aerospace and electronics (as well as chemicals), they can move far ahead of even the best foreign firms, which simply don't have the same access to such advanced technologies. They will be exploiting the strongest advantage of United States industry over foreign industry.

Development of such major new approaches to shoe manufacture requires research considerably beyond the final Stage 5 in-company research, both in technical sophistication and in cost. It requires cooperative sponsorship among the leaders, and it requires that the research be done by an organization that has experience in advanced aerospace, electronics, machine-tool, and chemical technologies as well as a knowledge of the shoe industry.

It is not clear now just where this research on shoe automation should be focused; therefore, the first step should be a cooperatively sponsored first-stage research program designed to identify the most promising approaches, and demonstrate the promise. This first-stage program should include a detailed technical-and-economic analysis of present shoe-production processes, identification of obvious approaches to automation, and preliminary evaluation of what could come from further research. It would serve as a basis for more detailed subsequent research.

The leading shoe manufacturers should sponsor this first-stage cooperative shoe-automation research program now.

Manufacturers Without Research Today

The shoe manufacturers without research capabilities today are now – or will be soon – in a very dangerous position. The changes that will bring a new world of advancing technology into the industry, and the increasing advantages the research leaders will gain, demand that the shoe manufacturer move into research and new technology or sink.

The larger and medium-sized shoe companies, which can afford and can profit from in-company research, should begin now to move through the steps of research advancement shown in Table 5.

The smaller companies are faced with a more serious threat: the cost of just a minimum capability to use outside shoe research is beyond many of them, and others who can afford to move into this first phase of using outside information cannot finance or profit from any internal research, even routine testing. The smallest companies (under one-half-million dollars in sales) will have to find some answer to their problem – possibly merger. The next-larger group of companies, in the range of $500,000 to $1 million sales, and probably some companies larger than this, will be forced to depend totally on outside research and therefore will virtually require a cooperative research program of some type.

Thus, these small shoe manufacturers are placed in the ironic position of being forced to sponsor a cooperative shoe-industry research organization, if one can be established, even though they know the more sophisticated larger companies will gain more from the organization. If the small manufacturers do not cooperate, they will fall behind even faster.

The revolution in the shoe-research environment is increasing the importance of company size and company research capability relative to style and merchandising in an industry where size and research have traditionally been insignificant in comparison to style and merchandising. The shoe manufacturer must develop technical capabilities and must overcome problems of size if his company is now too small. He must support cooperative shoe research. And, to escape from a position in which he falls farther and farther behind, he must move up among the research leaders.

The Industry

To move toward cooperative research in the best interests of all manufacturers, the United States shoe-manufacturing industry should next take the following five steps. The steps can probably best be carried out through the trade associations.

(1) Establish a United States shoe information center.

The industry can provide a valuable service to all shoe manufacturers at low cost merely by bringing together all available information on the shoe industry in one library, in a location convenient to United States manufacturers. Information that should be included in the center, carefully filed and cross-filed, includes:

(a) Historical information

(b) Industry statistics: sales, profits, import/export data, etc.

(c) Industry analyses: books, articles, financial-community studies, etc.

(d) Company literature: annual reports and other publicly available information

(e) Technical literature: articles and publicly available research reports on materials, machinery, fit, etc.

(f) Suppliers' product literature: brochures and other information on United States and foreign materials, machines, etc.

(g) Shoe-market studies

(h) Trade publications.

Such a center would help the individual shoe manufacturer to keep informed about the industry and new developments, and would also be of great assistance to the outsider who may have ideas that can help the industry.

(2) Work toward greater United States shoe-manufacturer membership in SATRA.

The industry should encourage each manufacturer to join SATRA, both for his own benefit and as a step toward cooperative research, and should also explore with SATRA possible arrangements for a new relationship between SATRA and the United States shoe industry.

(3) Help to develop a new shoe-industry consensus on group research.

Lingering hesitancy among United States shoe manufacturers toward cooperation in shoe technology is now the critical barrier to the much-needed (by every manufacturer) cooperative research that could be undertaken. This problem must be resolved by the shoe industry itself, and the form of cooperative research finally established will depend on how shoe-industry attitudes develop.

It appears that the best way to approach this critical task would be to establish a permanent shoe-research committee of influential shoe executives, under the trade associations, to first develop new appreciation of the gains for every company from cooperative research; and second, to select a best plan for organization and funding of cooperative research in the light of the new attitudes that develop. The large leading manufacturers should take the lead in this effort and support it fully, with the knowledge that with their greater capabilities they can gain the most from cooperative research.

(4) Establish a technical basis for cooperative research through standardization of nomenclature and dimensional definitions.

The first technical step in cooperative research, once the right attitudes are developed and the organizational and funding plan is finalized, must be standardization of nomenclature and dimensional definitions. This will in no way limit styling freedom, but will merely provide a common language for cooperative technical advancement.

Past failures in this area show that this first technical step will have to come after the change in attitudes.

Accomplishment of these four steps by the United States shoe industry will lead to strong cooperative research, to the benefit of every shoe manufacturer – to the small

manufacturer, who can accomplish research only through cooperation and therefore needs this program; to the larger manufacturer without research today, who will be aided by this program in his research buildup; and to the leaders today, who with their greater understanding of new shoe technology can use the results of the program faster and better.

Strong United States cooperative shoe research is a necessary ingredient in the industry's progress in the new world of shoe research.

RLC:all

APPENDIX A

CASE HISTORIES ON UNITED STATES MANUFACTURERS' SHOE-RESEARCH PROGRAMS

Case History I

"It's The Suppliers' Problem"

Case History I illustrates the most prevalent shoe manufacturer's attitude: that it is not necessary for him to do research and testing because "it is the suppliers', not the manufacturer's responsibility".

The argument goes as follows:

> "Competition between U. S. shoe industry suppliers is now intense enough to guarantee a steady stream of new materials and equipment. The suppliers know their business better than the manufacturer does. The 'word' gets around the industry pretty fast, so that a bad product will become known throughout the industry in a very short time. The suppliers' fear of losing the business of a customer is, in effect, a guarantee that the products will meet the requirements for which they were originally produced. If one product does not meet the tests of the real world, another product will".

This philosophy seems to be one of holding an economic club over a supplier's head and letting the product prove its value through successful use. The actual company in this case is a large manufacturer of staple low- to medium-priced men's shoes sold principally through its own retail stores. The styles, designs, and construction are more or less standarized and major changes are infrequent. Because of the corporate size and infrequent changes, supplier's products once proven useful are purchased in large amounts over extended periods of time.

The above situation is much less true for the many smaller companies of the shoe industry. However, the attitude expressed above is widely accepted. A natural result of this attitude of dependence on suppliers is the companion attitude: "Let other shoe manufacturers try it for a while first, and if it works, we'll try it".

Together, these widespread attitudes of dependence on others for development, testing, and proving of new items make adoption of any new idea or item a very slow process for the company and the industry. Each company waits for others to move first, and little or nothing is done by anyone with these attitudes.

Case History II

"Testing is Beneficial"

Case History II illustrates the attitudes of the management of a large integrated shoe company that has a formal testing program and well-equipped laboratory facilities. The establishment of a formal testing program is the first major step for a very high percentage of United States shoe manufacturers in developing in-company research, but few have moved this far.

In Company II, the following functions are served by the materials-testing program:

(1) Evaluation of new materials

(2) Comparison of competitive materials before purchase

(3) Testing of the received materials to assure that the buyer receives what is ordered

(4) Assistance in determining the cause of material malfunctions, and thus the avoidance of material problems in manufacture and service

(5) Development of new products.

The economic benefits of a materials-testing program are difficult to state in quantitave terms, but the companies that have active programs believe that the results are real. For example, a general statement made by the research manager of Company II was:

> "The net result is improved customer acceptance of our products through greater confidence in properly styled, uniformly high-quality footwear".

Benefits range from being the first company that uses a new material, often permitting a unique style or design variation, to the upgrading of the quality of vendor materials through standard specifications. Considering that purchased materials account for 50 percent of the manufacturer's cost of a pair of shoes, even a slight upgrading in material quality can have demonstrable sales features and/or reduced manufacturing costs.

An example of a specific result of a materials-testing program is illustrated below.

In Company II, the testing laboratory has worked with the purchasing department in establishing a complete materials-quality-control program. The development of this program involved the following steps:

(1) Selecting the items to be included in the program

(2) Defining the properties to be tested in each item

(3) Setting of standards (minimum test levels) based on known levels of manufacturing performance

(4) Writing of specifications to be used in ordering

(5) Setting a sampling procedure and spot testing incoming goods against the standards

(6) Adjusting of standards and specifications (usually upward), as experience develops.

In this program, all material complaints are registered by filling out a form showing the item, the number involved, the nature of the complaint, the vendor, and other identifying information. This form is filled out at the location of the problem by the person making the complaint – the warehouse, laboratory, plant or store.

The information on each form is transferred to an IBM card, and each month a summary sheet is prepared for the buyer that shows that vendor performance. By this system, the buyer has specific facts concerning performance, good or bad, which he can discuss with each of these sources and use for selection of sources.

Testing Facilities

Although the laboratory facilities of Company II are more extensive, it is possible to establish a minimum test facility with as little as $5,000 worth of laboratory equipment housed in 200 sq ft of floor space. As the Company II laboratory manager put it:

> "A more elaborate facility can be established as the economic benefits of the work accrue and are recognized throughout the organization".

Organization and Personnel

The test group of Company II consists of one graduate chemist and five technicians.

The qualification of the head of the test group is the most critical factor in the success of the operation. The management philosophy on personnel may be summarized as follows:

"The testing head may possibly be found within the organization. He should have a science or engineering education. Job experience in laboratory work is desirable. If the proper person is not available, it is wise to seek an experienced person on the outside. Since the most important piece of equipment in the laboratory is the mind of the man running it, the best available talent usually proves to be the least expensive in terms of getting the most out of the investment."

The testing head must be able to remain objective and accurate in his reporting. His organizational reporting relationship and his ability to deal with other people are important factors. These points were summed up in the following way: "Because the laboratory will often be called upon to act as arbiter in cases of responsibility, the head man should make the final report and not be responsible to any line section which may influence a report or decision. Next to technical competence, complete objectivity and impartiality are the most important requisites for a smooth-functioning laboratory".

"Technicians have usually come from the existing work force. Science training in school and high scores in tests for numerical ability, judgment, and perception are criteria for a good technician. Inspectors in the shoe plant who did well in science in school are prime candidates."

Case History III

Brown Shoe Company

Brown Shoe is reputed to have the most extensive and most advanced technical program in the United States shoe industry. The program covers a broad area, ranging from technical problem-solving and materials testing to investigating basic-research questions regarding the behavior of leather under various humidity and temperature conditions.

Corporate Background

An important factor in Brown's attitude toward research and development activities is the corporation's ability to finance it. Brown has one of the highest profit margins in the shoe industry. Forced by the 1962 Supreme Court antitrust decision to divest itself of the $70 million per year G. R. Kinney Division, Brown sold Kinney for $39 million in cash and $6 million in promissory notes and used some of this money to accelerate an extensive improvement and modernization program in all its factories.

In a recent article*, Mr. T. R. Volenetz, Vice-President of Manufacturing at Brown, described the shoe industry's need for technological improvement as follows: "Today, because of unequal trade advantages among nations of the world, because foreign countries have the advantage of much lower labor cost, domestic manufacturers unable to compete are losing sales to these foreign countries. This fast-moving world and our inability to compete in world markets as an industry has been responsible for awakening the American shoe manufacturer for greater efficiency, methods and procedures that will result in lower costs.

"American manufacturers are facing up to this challenge and are working feverishly to simplify and speed existing processes. New developments in machines and transporting systems from cutting to packing are being installed in many plants. The shoe industry, because of its rapid changes in styles and the great variety of materials that are used, is less adaptable to automation than most industries. It is conceivable, however, that great technological improvement can be made which is most certain to improve the industry's position"

Brown's R & D Program

The Brown research and development objectives were summarized as follows:** "We will continue to screen closely all new technological developments and apply them wherever it appears they will bring us closer to our objective of reduced costs and improved Brown quality".

Testing. Mr. Volenetz considers wear testing a must for all new materials. Tests are conducted on materials to establish minimum standards for the purchasing department. A sample from every material coming into Brown is tested to check the quality against the

* Volenetz, T. R., "Transporters and Heat Setters", Technical Journal of the National Footwear Manufacturers Association, 2 (1), 24 (January 1964).

** Ibid.

original purchase specifications. There is no question in the mind of Brown management that testing has a high payoff. As a result of established lab-test procedures, Brown has reduced the number of arguments with suppliers over faulty materials. There are now few questions regarding what is acceptable and what is not acceptable. There has also been an intangible gain in that suppliers no longer ship materials to Brown Shoe that will not meet Brown specifications because they know that the materials will be rejected when the tests are performed. The economic benefit of such a program is hard to measure with high accuracy, but considering that materials costs total about half of sales in shoe manufacturing, it can be assumed to have a sizable dollar value. An additional benefit is the lack of problems after shoes are made with a new material and have been delivered to the customers.

Brown has run extensive tests on white man-made materials for use in nurses' and other professional shoes. They were particularly concerned with the color-staining problem of man-made materials when used with other shoe components, which include everything from metal eyelets and nylon thread to various cements and other chemicals. Because man-made upper materials are not polished when completed, any stains or imperfections that occur during manufacturing cannot be readily disguised by covering them up after the shoe is finished. Brown technicians conducted a series of tests to determine the compatibility of white man-made materials with all the other materials with which it would come into contact during manufacturing and later use. These tests were conducted both in the laboratory and in the field. The result of this program showed that the white materials were susceptible to discoloration by various cements and metal eyelets. Brown executives believed that any discoloration would be objectionable to the consumer and that sales of the finished shoes would be impossible.

Brown then had several meetings with the manufacturer, and the use of the material was delayed until the technical problems were overcome and the material performed satisfactorily.

Manufacturing Processes. The Brown test laboratory in 1965 was staffed by 25 people and was growing rapidly. In addition to the testing people, the group includes a team of troubleshooters. These men, most of whom are industrial engineers, constantly travel from factory to factory solving technical manufacturing problems. The payoff from this work is prevention of slowdowns of production that can cause costly delivery delays to Brown customers.

The first conveyor was installed in a Brown plant in 1960. Prior to that time, a study had been made of all available conveyor equipment and it was found to be unsuitable for the Brown operations. Mr. Volenetz said that any equipment must be tailored not only to the particular type of shoe being constructed but also to the peculiarities of the plant itself. Unable to buy exactly what was required, Brown designed special conveyor systems and had them built on a subcontract basis.

Approximately one-third of the firm's 36 shoe manufacturing plants and five auxiliary-supplies plants have been or are in the process of being air-conditioned and humidity controlled. Eleven plants are conveyorized and have heat-setting equipment.

Table A-1 summarizes the results of the Brown conveyor program. According to Mr. Volenetz, this program has drastically speeded up the production rate, has enabled workers to increase their earnings, improved shoe quality, increased productivity by 10 percent, and reduced work-in-process inventories by 30 percent.

TABLE A-1. RESULTS OF BROWN CONVEYOR AND HEAT-SETTER PROGRAM

	Before	After
Last Time	3 days	4-1/2 hours
Direct Labor/Pair	N.A.(a)	Same
Indirect Labor/Pair	N.A.	Reduced
Day Work Cost	N.A.	Reduced
Producitivity/Operator	N.A.	Up 10%
Work-in-Process Inventory	N.A.	Reduced 30%
Operators' Hourly Earnings	N.A.	Up 5%
Quality	N.A.	Up

Source: T. R. Volenetz, "Transporters and Heat Setting", Technical Journal of the NFMA, Vol. 2, No. 1, January 1964, p 25.

(a) N.A. indicates information not available.

Fundamental Research. The shoe industry has known for many years that benefits could be realized from mulling leather and then slowly drying it on the last. This process took several days when air drying was employed. It only recently has been discovered, through research done by SATRA and others, that the application of certain temperatures to the lasted shoe for a brief period could cause a plastic-flow release of stresses put into the leather fibers by the stretch in the lasting operations. This resulted in a finished shoe that had a better fit and longer shape-retention characteristics.

There are several basic questions concerning heat setting that are still unanswered. Brown currently has a program underway to answer the following fundamental research questions:

(1) What moisture content should be in the leather at the beginning of a heat set?

(2) At what temperature does heat setting actually occur?

(3) Should the moisture content and temperature vary on different leathers?

These questions illustrate the more fundamental research effort that Brown is undertaking.

Case History IV

Wolverine World Wide, Inc.

Wolverine is the fastest-growing major company in the United States shoe industry. It is considered by many shoe industry observers to be the most advanced shoe company in adapting to change and in exploiting new ideas. It is an outstanding example of a company that has been able to put all of the business elements required for success – research, people, products, manufacturing, and finance – together in the right sequence at the right time. Wolverine has successfully exploited the growing taste of consumers for casual footwear by producing shoes with an extremely high value-to-price ratio in the styles most desired. Their success in United States markets is now being repeated in foreign markets. About 15 percent of 1965's net income came from licenses in 18 countries.

Between 1960 and 1964, sales increased 269 percent and net earnings increased 240 percent. During this period, the ratio of net earnings to sales increased from 3.67 percent to 8.59 percent. In 1965, sales were $55.37 million – 12.9 percent higher than the previous year's sales. In 1965 Wolverine was the seventh largest shoe company in sales dollars and the sixth largest in pairage produced. A comparison of Wolverine's performance with other leading United States shoe companies is shown in Table A-2.

TABLE A-2. COMPARISON OF WOLVERINE WITH LEADING SHOE COMPANIES

	Earnings		Sales		Earnings as Percent of Sales	Equity[a]		Earnings as Percent of Equity	Internal Growth Score
	1965 vs 1964	5-Year Growth Rate	1965 vs 1964	5-Year Growth Rate		1965 vs 1964	5-Year Growth Rate		
Shoes	+15.6	2.4	+8.0	3.9	3.0	-0.5	2.5	11.4	75.1
Wolverine	+16.8	31.7	+16.0	17.4	8.6	+31.6	17.8	35.3	233.1
Brown Shoe	+12.8	6.7	+7.1	0.1	5.3	-11.7	9.3	14.4	83.7
Endicott Johnson	+19.8	None	+2.3	None	0.7	+2.2	None	2.2	None
International Shoe	+27.7	3.3	+11.9	4.3	2.8	+6.5	0.2	9.2	69.9
Melville Shoe	+10.6	5.8	+6.3	5.5	3.5	+16.5	6.7	23.9	95.9
Shoe Corporation of America	+4.7	4.2	+7.4	11.5	1.5	-7.4	2.8	11.3	86.6
Moody's Industrials	+13.6	10.5	+8.9	6.7	7.2	+7.4	4.8	14.9	100.0

Source: Dun's Review, January 1966, p 37.

(a) Moody's Internal Growth Score. This highly revealing statistic combines in a single index number (100 is average) the rate of growth of sales, earnings per share, equity, return on equity, and retained earnings.

The central reason for Wolverine's success was described by Dun's Review* as follows: "In an industry that has been notorious for its slow-footed ways, this fast-paced newcomer has been disregarding the old rules and playing the game with some new ones. Two factors have generally contributed to the company's extraordinary performance: (1) the development of an exclusive and inexpensive source of American pigskin; and (2) the marketing of this pigskin in a casual shoe – Hush Puppies which has become the most widely recognized single brand in the U. S. industry in the world."

The Hush Puppies Story

Wolverine's history dates back to 1883 when the Hirth-Krause Company was formed in Grand Rapids, Michigan, for jobbing shoes and shoe findings. In 1901, a shoe factory was built in Rockford, Michigan, and in 1904, a tannery. Shortly before World War I, the tannery developed a less expensive method of tanning the tough rump hide of horses to produce a soft leather that it made into work shoes and boots. The high-top shoes and boots became standard equipment for many farmers and industrial workers around the country.

With the mechanization of the farm in the 1940's, tractors all but replaced most of the remaining horses on farms, and the number of farmers declined with the move toward urbanization. Moreover, low-cut shoes were coming more into vogue with workmen. By the mid-1950's. Wolverine was faced with a declining supply of raw materials and drastically changing conditions in their products and markets. Mr. Adolph K. Krause, a descendent of the founder and now President, described the situation as follows: "Back in 1955 when we were still closely held, and the supply of horse hide was going down while the price was going up, we needed to decide what our future course would be. There was a great divergence of ideas among the Directors about what direction we should take. So for the first time we turned to directors from outside the company to help us plot our course. It was one of the wisest things we've done. They helped us more clearly define lines of authority and helped us evaluate courses of action. This new insight into management, along with the (pig-skinning) machine's production capabilities and marketing orientation, got us on the right road."**

Research: The Starting Point. An early decision of this new board of directors was to look for products that would make Wolverine unique, rather than to follow the standard paths that other companies in the shoe industry were pursuing at that time. They called in a management consulting firm to review the company's operations and to make suggestions for improvements.

Fortunately, Wolverine had developed an important capability as a hedge against its declining market. During World War II, the company had experimented with pigskin shoes as a substitute for possible use in any cowhide shortage at the request of the United States Government. Wolverine found that pigskin was highly resistant to rot, that its large pores provided good ventilation, and that pigskin is the third-toughest leather for its weight, ranking behind kangaroo and shell cordovan.

* "Management's Rule Breakers: The Ways of the Winners", Dun's Review and Modern Industry, January 1966, p 83.
** Silversmith, C. "Mr. Hush Puppies", Footwear News, Thursday, October 21, 1965.

On the other hand, skinning the ordinary hog had been a problem. Horsehides or cowhides can be peeled off, but pigskin is locked onto the flesh and has to be carefully removed. The removal of cowhide is analogous to peeling a banana, while pigskin clings like the skin of an apple. If the pig is not skinned close enough, fat or lard is removed, and this is worth more to the meatpacker than the skin. Skinning by hand was and is an uneconomical process for the meatpacker.

At the end of World War II, Wolverine bought a patent for a pigskinning machine from a large meat-packing firm and initiated a research program to improve the machine as a source of a unique material for shoes. Seven years of research and an investment of approximately $2 million was required to perfect a mechanical skinner that would produce top-grade pigskin economically and in large quantities. With a source of pigskin available, Wolverine then developed ways to tan and finish this skin so that it was suitable material for shoe uppers. Today, Wolverine is the largest purchaser in the United States pigskin-for-leather market as a result of the mechanical pigskinner.

The pig-skinning machine was the base upon which Wolverine built its phenomenal success story. But this machine is not at all the whole story. Wolverine also has done an outstanding job of putting together a total-management program for exploiting this research product, as described below. And Wolverine has continued to achieve further gains through research, as outlined in the next section.

The Total-Management Program for Exploiting Research Results. In 1958, Wolverine introduced the new brand that has since become a household word – Hush Puppies, a casual shoe made with brushed pigskin uppers and a light-weight crepe sole. The product was basically different from other shoes then on the market. It filled the gap between the canvas-rubber tennis shoe and the more formal leather-upper dress shoe. After a test marketing of 30,000 pairs of Hush Puppies, Wolverine invested $150,000 in a national advertising campaign during the first year. In contrast to long-established shoe-industry policies, the same brand name was used for all styles, for men's, women's and children's shoes.

Wolverine also set up a unique distribution system of selling Hush Puppies to almost any quality high-rated retail store. The shoe industry has traditionally granted exclusive franchises. Mass distribution was established by forcing the retailer to carry Hush Puppies. The retailer's customers saw ads, liked the shoes, and asked him to get them a pair. In late 1965 the first "all-Hush Puppies" store was opened. This stimulated the other Hush Puppies dealers in the area (Dayton, Ohio) to increase their Hush Puppies inventories, which resulted in a significant increase in sales volume. Wolverine is planning to rapidly increase the all-Hush Puppies store concept* during 1966.

Wolverine has consistently budgeted about 7 percent of anticipated Hush Puppies sales each year for advertising, compared with an industry average of 1.5 percent. Wolverine also has a unique employee-relations plan called the PAL Plan (Period Allowance for Labor), which is based on the Scanlon plan of payroll and incentive bonuses. Employee wages at Wolverine are now 27 percent higher than the shoe industry average and 33 percent higher than the average for the tanning industry. All this is accomplished without increasing the unit labor costs of the final product.

* Wolverine has no ownership in these stores.

To the Hush Puppies program – well-directed aggressive research, combined with a powerful total-management program to exploit research results – Wolverine owes the phenomenal profit-and-growth record the company has achieved.

The Wolverine Research and Development Division

In 1961, the importance of having a separate research and development activity was recognized at Wolverine, and the Research and Development Division was established in a formal manner. It was started with two people, John Harrington (an industrial engineer who once was associated with General Electric) and a secretary, and has now grown to 14 people. The Research and Development Division pursues the following objectives:

(1) To seek new products that will widen sales opportunities

(2) To develop methods and machinery that will lower the cost or production operations

(3) To evaluate and develop materials to maintain and improve quality standards of the final product.

The company's emphasis on research and development has been noted frequently in annual reports. For example, the President's letter in the 1963 Annual Report had the following comment: "Your company continues to set the industry pace in research and development. Appropriations for such activities are more than double the shoe industry's average rate and contribute to your company's ranking as the fastest growing shoe manufacturer." Currently, Wolverine management budgets approximately one-half percent of sales for research and development activities. Based on 1965 sales of $55.4 million, the research and development budget was about $277,000.

An organization chart showing the relationship of the Research and Development Division to other corporate divisions is shown in Figure A-1. The Research and Development Division is a corporate function reporting to the Executive Vice-President. Under the Vice-President for Research and Development are four functional areas: New Processes, New Mechanisms, New Materials, and New Products. These operations are staffed by a total of three graduate engineers, four laboratory technicans, and five model makers. Also reporting to the Executive Vice-President are the other corporate functions such as Finance, Manufacturing, Marketing, Industrial Relations, International Operations, and Leather Operations. There is also a Vice-President of Engineering with a staff, who works closely with Research and Development but is primarily concerned with the plant and industrial-engineering operations of the factories. New shoe designs and styling is performed by groups reporting to the Vice-President of Manufacturing.

The Research and Development activities are now housed in a separate, 10,000 sq-ft area located in a new addition to the main Administration Building.

The Research and Development Division functions primarily as an idea generator and implementer. It does this by looking at all operations and trying to determine the areas where high-cost operations can be eliminated, or a critical labor operation or an operation where labor is hard to find can be reduced in complexity. In many cases, the solutions are worked out by simply analyzing the operation. In other cases, innovations

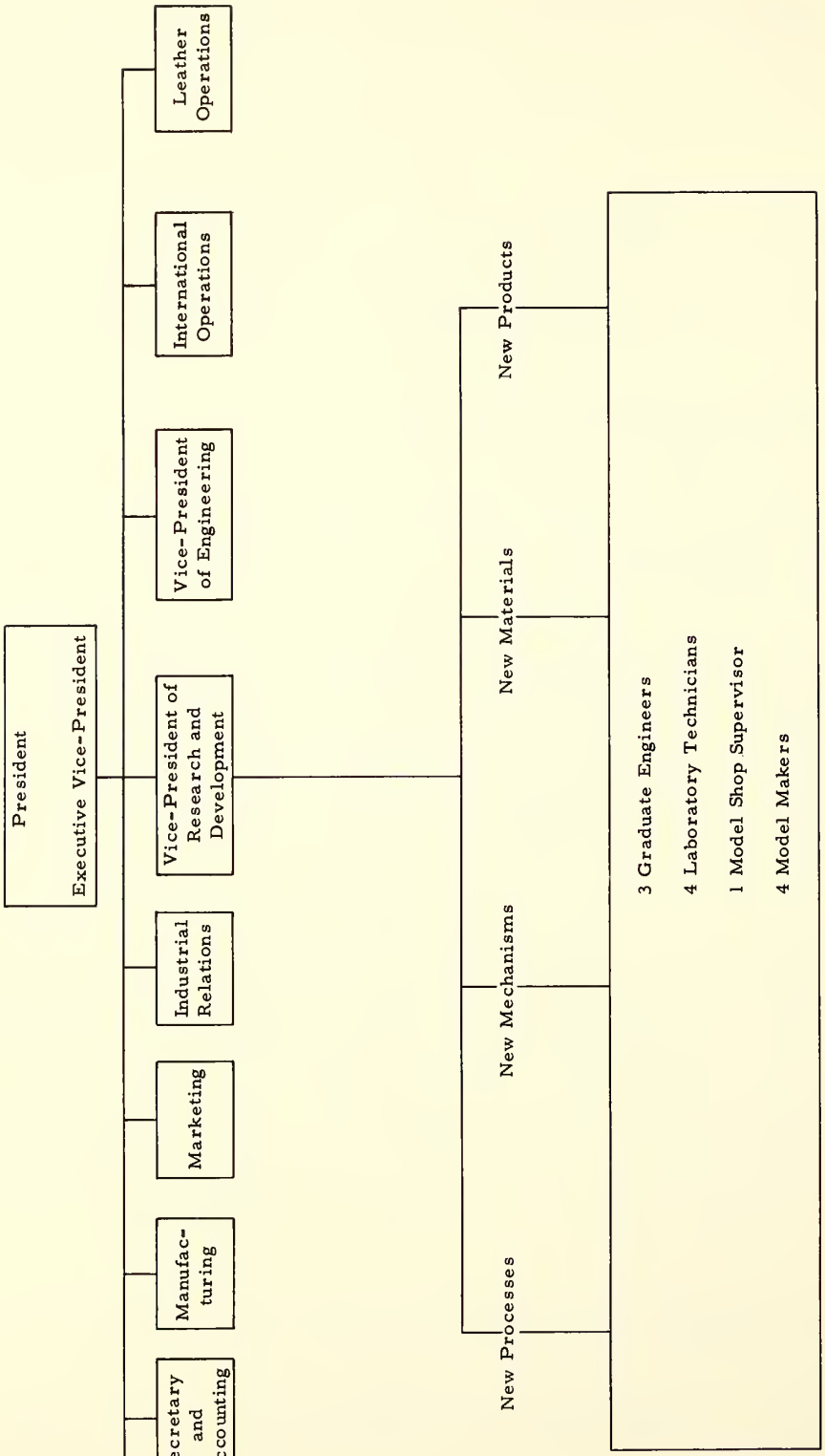

FIGURE A-1. ORGANIZATION CHART OF WOLVERINE WORLD WIDE, INCORPORATED, SHOWING THE RELATIONSHIP OF RESEARCH AND DEVELOPMENT TO OTHER CORPORATE FUNCTIONS

are brought into the factory from other industries. The Research and Development staff spends a good deal of its time searching for solutions to similar problems in other industries. For example, new ideas concerning the rapid drying of cements are being looked into as a result of reading about similar problems and their solutions in the furniture industry. In addition, frequent contact with foreign licensees has generated new-product ideas and enabled the Research and Development Division to acquire new materials for evaluation much faster than they would have through normal channels. Exposure to foreign competition and ideas is believed to be an excellent source for new ideas.

Because of the relatively small size of the Research and Development staff, extensive use is made of outside specialists. For example, in a recent machine-development program, the Research and Development Division staff developed a motion pattern for the new machine, and then called in an outside machine-design specialist to reduce the ideas to a set of drawings from which prototype hardware could be assembled. In this case they built the prototype in their model shop, and once it was running had the production models built by an outside machine-shop contractor.

Proposed Research and Development projects are evaluated on the basis of feasibility and the economic impact that they are likely to make on an existing operation. Wolverine generally looks for a payback on the original research and development investment within a 3-year period. Consideration is now being given to the licensing of several patents that have resulted from Wolverine Research and Development activities. Mr. Harrington stated that this is a possible source of income and a way of financing additional research and development.

Wolverine believes that these research and development activities have placed them ahead – far ahead – of most United States companies.

Accomplishments of the Research and Development Division

Some of the more interesting results of work performed at Wolverine's Research and Development Division are discussed below.

Automatic Machinery

(1) The Pigskin Remover*. As the popularity of the Hush Puppies had increased, Wolverine's growth became limited by the availability of pigskin in large quantities. Through the development of a mechanical system of removing the pigskin during the slaughtering process (removal by hand is prohibitively slow and expensive for volume use) and the installation of these systems in an increasing number of slaughtering plants, Wolverine has gained access to the substantial supply of American pigskin produced each year. The principal alternatives of large-volume slaughterers to using the patented Wolverine system are to convert the hides to gelatine or sell the product as edible cracklings, receiving in either case less than that paid by Wolverine. Thus Wolverine is the only company able to procure domestic pigskin for leather use in volume, and at a substantially lower price than cowhide and the imported pigskins. The growth in demand for pigskin is continuing and Wolverine is constantly attempting to find additional sources.

* Developmental work on improved pig skinning equipment and related accessories is, also, a major function of the Procurement Department of the Leather Division.

This problem was expressed in the 1964 Annual Report, which stated: "Pigskin procurement has been intensified. We are constantly negotiating with additional packers to install our patented mechanical skinners in their plants and to sell us pigskin. More than 20 plants now supply us."

Five patent applications were filed in 1963 for new designs or improvements in pig-skinning equipment. The aggressive patent program is designed to retain Wolverine's dominance in the pigskin market.

A second-generation machine, the "double skinner", which skins both sides of the pig at the same time, has proven its practicality from both the meat packer's and the shoe manufacturer's standpoint. When processed into leather, the large skins resulted in lower tanning costs as well as higher cutting yields in the Wolverine factories. The larger skins will permit Wolverine to introduce other products such as pigskin coats and jackets. Hats were first introduced in 1963 and have proved to be a profitable product line.

(2) The Crepe-Sole-Edge Trimmer. A new automatic machine that trims the edges of crepe soles was put into full-scale operation, achieving substantial savings in what had previously been a costly operation.

This machine was designed and developed by Wolverine's Research and Development Division because no existing machine could do the job satisfactorily. Stamped sole blanks are fed automatically into the machine, which defines the sole outline and smooths the edges. Pretrimmed soles are then cemented to shoe uppers. Formerly, trimming was a hand-fed operation, on soles already cemented to the uppers. This resulted in a high-cost operation with a high rate of "cripples" or rejected shoes. The new method cuts high operating costs by two-thirds, increases output, and improves quality.

The investment of 3 years and considerable funds in research and development will be repaid in a very short time though production savings. It has proven so successful that additional machines are being built.

(3) Sole Sanding Machine. In 1964, patent applications were filed on a sole sanding machine that smooths the surface to which heels are cemented. The former method of hand feeding raw stock into the sander has now been completely automated. Wolverine representatives stated that this machine "increased productivity four times and improved the quality of the finished sole."

(4) Heel Breasting Machine. In 1964, patents were granted on a new "heel breaster", which automatically shapes the front edges of heels.

Tannery Equipment.

(1) Waste-Disposal System. In 1962, Wolverine was faced with a decision to make a major capital investment in a waste-disposal system because of the rapid growth of tanning activities. The Research and Development Division, by working with the tannery people, developed improved tannery processes that sharply reduced the effluent and the resulting pollution. This forestalled the larger expenditure for a new waste system.

A 2-year modernizing program at the Rockford pigskin tannery was completed in 1964. More mills were installed so that all liming and tanning is now performed in one process instead of two.

This modernization program increases production, reduces costs, saves space and increases waste disposal efficiency.

(2) New Leather Features. In 1963, engineering studies led to development of new leather-treating methods that produced leathers that are exceptionally durable and that can be securely bonded to soles of lightweight shoes.

New Products.

(1) Shoe Brush. In 1963, a new type of shoe brush, with nylon bristles surrounding a core of steel bristles, was patented and introduced to the retail market. This product permitted the consumer to periodically rejuvenate and clean his Hush Puppy shoes.

(2) The "Free Loader" Skiboot-Pole Carrier. Wolverine has marketed a combination skiboot-pole carrier, "The Free Loader", which was developed in the Research and Development Division.

(3) The Brushed-Leather Waterproofing Color Restorer - Revive. A new Wolverine product is the brushed-leather waterproofing color restorer, Revive, which is supplied in an aerosol spray can. One of the Wolverine overseas licensees suggested that such a product would be successful in the United States market. The Wolverine Research and Development Division worked with du Pont to develop and test a suitable product. This product is now being introduced into a number of United States retail outlets - for example, chain stores and supermarkets - where Wolverine has not previously had retail distribution. The waterproofing color restorer will undoubtedly lead to other shoe-care products that can be sold through the same channels. These products offer considerable diversification possibilities beyond the company's traditional shoe and tannery business.

(4) Fitting Device. A new metal fitting device based on the American last standard system is being developed for "the more accurate checking of the position of the foot in a shoe". This will be available to retailers for about $20.

APPENDIX B

CASE HISTORIES OF EUROPEAN MANUFACTURERS' RESEARCH PROGRAMS

Case History V

Company V

This company with its large research, development, and production services activity is believed to rank in the top five shoe research organizations of all types in the free world. The emphasis on research is only a part of the company's total emphasis on advanced management techniques.

The company is now worldwide and employed approximately 12,400 employees at the end of 1964. The firm makes several ranges of shoes and each range (in men's, women's, and children's styles) is based, wherever possible, on a separate factory so that manufacturing can be concentrated exclusively on one particular type of footwear. Shoes are manufactured in factories located in several foreign countries. Shoes are also made under license. In two large markets, shoes are distributed through company-owned wholesaling companies. In the home country, shoes are distributed through wholly-owned retail shoe stores and through a large number of independent shoe merchants.

Company V is the largest shoe manufacturer in its home market, accounting for about 5 percent of all shoes sold. However, it was much more dominant in the women's branded-shoe segment, where the company accounted for a very high percent of total production. The company's share of men's, women's, and children's branded shoes are shown in Table B-1.

TABLE B-1. MARKET POSITION OF COMPANY V

Millions of Pairs

	Total	Men's	Women's	Children's
Company V	11.1	0.6	4.6	5.9
Total Branded	46.4	10.8	22.2	13.4
Percent of Total Held by Company V	23.9	5.6	20.7	44.1

The Role of Research in the Organization

An active shoe-research program for the past 9 years has helped to place Company V in the leading position in its shoe industry. During recent years, critical labor shortages created the need to continually improve the productivity of its labor force. The research program has been successful in that the company's total world production has risen 42 percent while total employment has gone up only 13 percent. Company executives estimate that their work in the application of heat setters has placed them 4 to 6 years ahead of leading United States companies. They believe that they are also well advanced in injection molding, cement-construction techniques, and color-change techniques on finished shoes.

While the research program has been given considerable credit for contributing to the company's overall success, it is expected to play an even more important role in the future. The company has been highly integrated from an early date and now owns or controls factories that manufacture lasts, heels, rubber components, leather-board, patterns, and shoe machinery. These supply companies sell their products to other shoe manufacturers as well as supplying the needs of the parent company.

The Research Organization

As shown on the organization chart in Figure B-1, the Research organization is a part of the Production Services Department. It shares equal status with the Development Engineering, Work Shop, and Work Study organizations. The Research organization consists of approximately 40 people organized into three sections: Technical Services, Special Projects, and Major Projects. The Technical Service section is the largest and is responsible for all chemical laboratory analyses and testing projects. The other two sections are organized in a flexible manner around specific projects.

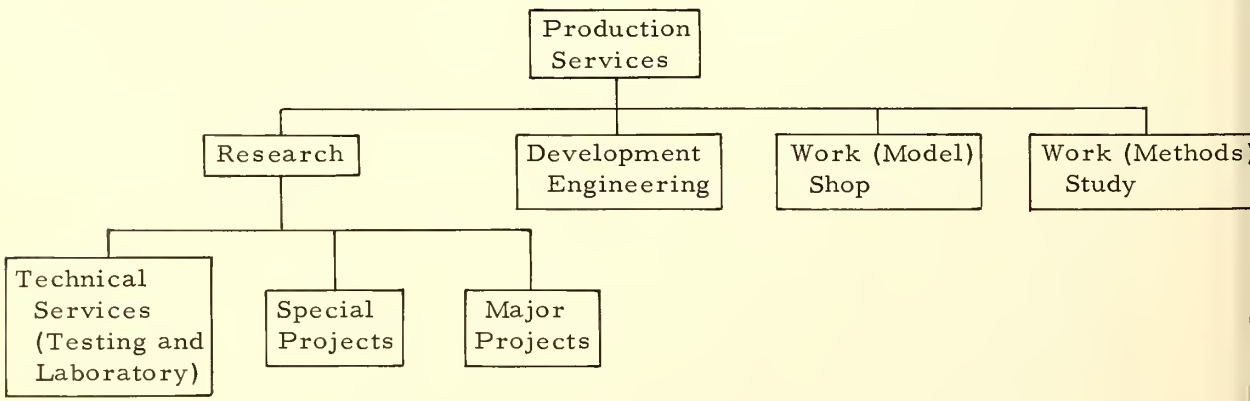

FIGURE B-1. SIMPLIFIED ORGANIZATIONAL CHART SHOWING RELATION OF RESEARCH TO OTHER FUNCTIONS

Research Activities

In the following pages, some of Company V's research operations and accomplishments are described.

Improvement of Production Methods. Research on production methods was undertaken for several reasons: (1) to produce a faster delivery in a shorter "pipeline" between the manufacturer and retail sales outlet; (2) to move the shoes through the factory at a faster pace; (3) to reduce capital employed to optimize the return on that capital; and (4) to reduce numbers of lasts to make style change less costly. Research has paid off. Today, a particular type of shoe can be made in about 13 hours, compared with 21 days only 5 years ago. Additional attention has been given to preplanning scheduling, and the total time has now been reduced from 2 weeks to 1 week.

An extensive conveyor system has been installed throughout all plants. Different types of conveyors are used in different operations. For example, in the stitching room continuous pivot belts are used, while in the making room continuous driven belts with pins are used to carry shoe lasts. Results obtained include reduction of downtime from 45 minutes to 12 minutes per thousand pairs. Production-control methods have been highly developed and last turns have been increased from 2 per week to 20 per day. Product engineering has raised standards, especially in pattern cutting, to achieve regularity; and as a result, the rejection rate is reduced by about 50 percent while the work content has been reduced by 20 percent. The work-in-process inventory is reported to be 5 percent of what it was 5 years ago.

The long-term objective of research on production methods is to break down traditional barriers that now divide the complete shoe-making process into separate departments under separate supervision: cutting, closing, making, and training. The company has developed a concept of a small but complete shoe-making unit under one supervisor. Company representatives claim that at the present time a team of 14 workers can produce approximately 150 pairs hourly, making use of new assembly and injection-molding techniques.

Analysis of Making-Room Operations. A time-study and work-analysis group found that the conventional making-room operations were conducted in such a way that only about 15 percent of the workers' total time was spent in making shoes. The other 85 percent of the time was spent in some way that added virtually nothing to the shoe. This was due partially to the fragmentation of the total shoe-making process into small elements, which necessitated constant picking up and putting down of parts, and partially to the random nature of production scheduling, which required a great deal of machine set-up procedures.

Significant strides have been made in improving this situation. Some of the methods employed are: (1) combining of fragmented operations, (2) preassembly of all parts that can be done off the main production line, (3) developing new processes and methods that permit one operator to perform more of the process, (4) specializing operators on single design methods, (5) designing shoes to reduce the variety of component construction and work content.

A New Bonding Process. A process has been developed that allows the attachment of linings to upper materials and of decorative materials to the outside of the shoe. For example, it is possible to attach a complex-shaped decorative piece to a suede upper. The need for this resulted from the shortage of skilled stitching labor; the use of low-skilled stitchers restricts the styling to relatively simple designs and lowers the output potential of the production unit. Wide variation in work content between one design and another presents serious obstacles to mass production and severely reduces flexibility in meeting demands for fast reorders. The process has enabled the company to overcome these problems in a profitable manner.

Color Changes. It is difficult for the shoe manufacturers to respond rapidly to the fast changes in color fashion in women's shoes, partly because of delays in receiving materials in the correct color. The manufacturer must either try to predict popularity of colors and invest money in inventories of materials in particular colors, or suffer delays in getting materials in the right colors.

A research program was initiated to overcome this problem. The company started its development with a feasibility study to see if a standard base-coat leather finish could be developed. Its purpose was to standardize the wide variety of leathers so that they could accept a standard finishing system. Results of tests on "new" and "after-wear" shoes were very encouraging. When completed, this development project will enable upper pieces to be ready-cut and stored awaiting color instructions, on which the shoes can then be completed within a short time in the desired fashion color. A longer-term goal is to develop a system by which shoes can be completely made up and colored to order at a later date. The economic effects on inventory reduction and on the sales potential resulting from fast delivery on reorders is quite significant.

Testing. Thousands of tests are conducted each year to insure that all components used in the construction of shoes will give satisfactory service under normal conditions of wear. This very extensive testing effort is supported because "if the testing is left to the customer and he discovers the fault for himself, there is no more certain way of losing good will and prestige".

A large number of materials are utilized in the manufacture of the wide range of styles and types of shoes. The testing of these products at regular intervals is a complicated task. To illustrate the degree of complexity, the research head commented as follows: "Let us take upper leather for instance. This is produced from an inherently variable material, and is a complication presented to us by nature. Add to this the human element, the fact that each tanner has his own ideas of how hides and skins shall be converted into leather, and you begin to see the problem. It gives some idea of the size of this problem with which we are faced. The following figures are some sort of yardsticks: we are using about 400 different types of leather which are obtained from 110 different sources."

The research activity is not concerned with the thickness, color, and cuttability of the leather. The responsibility for acceptance tests lies elsewhere in the organization. Research and development tests are concerned with such items as measurement of leather's ability to be stretched over the last without breakage. Other questions for testing are: (1) Will the leather retain its shape when formed on the last? (2) Can the leathers be satisfactorily bonded to soling materials? (3) Can the leather withstand wet

rubbing without its surface finish being removed? (4) Will the leather, when used in unlined footwear, remain color-fast and stain-proof?"

In addition to leather, extensive tests are performed on many other materials used in shoes, such as threads, soling, insoles, linings, linings reinforcements, tapes, stiffeners, toe tops, heels, top piecing, and adhesives. Because 90 percent of the company's shoes are of adhesive-cement construction, special attention is given to insure that the adhesives meet rigorous standards.

Another important function of the test group is to carry out a continual search for and evaluation of new materials. With the traditional materials, the company has a long history of experience that aided in the evaluation of test results. The introduction of synthetic materials has produced a new problem. Company personnel had no experience with the materials when they were first introduced. There was no experience available to interpret test results. In the case of Corfam, the company was one of the first shoe manufacturers to test the material. Some 2 years or so after the first evaluations, the research head was still unable to accurately forecast how this product would behave in all circumstances and under all conditions of wear. As a result, the laboratory is occasionally accused by other within the company of being slow in producing results. Sometimes this is a justified criticism, but more frequently it is the desire and the necessity for reliable, accurate results that causes the delay.

The test laboratory examines all shoes returned by retail customers to the "guarantee department". Test personnel attempt to establish whether the damage is attributable to the material, to wear and tear, or to some other mishap over which the manufacturer has no control and therefore cannot be held responsible.

Fit. The shoe manufacturer is faced with the problem of reaching a compromise on the shape of the shoe that will satisfy both foot health and current fashions. He must reconcile the orthopedic needs with the shape that the consumer demands. Unless he does this his shoes will remain on the retailers' shelves. As fashion cycles change from round toes to pointed toes, for example, the question of how far the stylist can be permitted to change the shape without endangering the foot health of the wearer becomes important.

In order to resolve this question, a program was undertaken in the early 1960's to develop more data on foot dimensions. Survey teams have measured the feet of 6,000 women and 9,000 children.

As a result of this work, standards were established that permitted the design of shoes along the latest fashion lines so as to have commercial appeal, but that were yet well within the bounds required for satisfactory fit. Company executives believe this research has significant economic payoff for the individual shoe manufacturer. A satisfactory fit is believed to be the strongest link in the manufacturer-retailer-consumer chain.

Market Research. A market-research department has been established to aid in making corporate decisions by applying sophisticated techniques. The market research program is directed toward the following three areas:

(1) The prediction of product acceptance

(2) The analysis of long-term trends

(3) The analysis of new markets.

These activities are discussed below.

A research program has been established to develop a more systematized approach to the problem of determining the public's reaction to new shoe constructions and style. The basic purpose of the research is to reduce inventory risk at the manufacturing and retail levels through scientific analysis. This information enables company executives to predict the total demand more accurately and to manufacture the shoes that will be in greatest demand in the quantities required.

The information is made available to retailers to assist them in ordering the company products that will produce the greatest turnover and profit. The retailer is interested primarily in answers to two questions:

(1) Will this shoe attract my customers?

(2) Will it sell better than another shoe?

These questions are answered by gauging the consumers reaction before the shoes are seen by the retailer. It is believed that retailers are unable, in many cases, to accurately predict their own customers' desires. Few retailers are in a position to collect data on future consumer desires except in a general, "impressionistic" way. By carefully assembling the impressions of a large group of consumers and analyzing the data in a scientific manner, the decision-making risk can be reduced. This is an inexact science, but company executives believe there is a significant payoff in making investments in this area.

The company is working toward greater penetration of markets in other European countries. The market-research group is attempting to assess the location of the best market opportunities. Traditionally, the company has exported approximately 10 percent of its production. These shoes went primarily to countries that are now restricting imports to protect their own industries. As a result, the company is forced to look for opportunities in other foreign markets. It is believed that an additional benefit of selling products in foreign markets is the constant need to develop new ideas and techniques. Many new developments found in other countries are valuable in producing new types of shoes for their primary domestic markets.

Case History VI

Company VI

It is estimated that Company VI would rank somewhere between the seventh- and fourteenth-largest United States shoe company in sales. Factories are located in four principal countries in Europe. Company VI is a truly international shoe manufacturer with customers in 35 countries.

Each market has different tastes that require a wide variety of materials, weights, constructions, and designs. Because of the many variations in the product, production of a given type is in small lots. High-volume production techniques are not possible, although extensive efforts have been made to improve productivity because of a critical shortage of skilled labor.

The Research Program

The research department was established in 1927. Several shoe executives in the United States consider the Research Department to be one of the best in the world.

The research staff consists of approximately 5 graduate engineers and 18 technical assistants. The research budget is about $100,000 per year. This level of effort is reported to be the highest relative to corporate size (net profits) of any company in the Free World.

The budget is allocated among different program areas roughly as shown in Table B-2.

TABLE B-2. COMPANY VI – ALLOCATION OF RESEARCH FUNDS

	Testing	Research
Materials		
Leather	$25,000	
Fabrics		$20,000
Rubber		
Plastics		
Chemicals	25,000	
Machines		30,000
Total	$50,000	$50,000

Research Accomplishments

The following are examples of typical research programs:

(1) Development of a flexible counter designed to conform closely to the contour of the last. Through the application of a special solvent, the material has a variable plasticity that helps speed up its use in production.

(2) Development of a patented shank made of plastic reinforced with a wire mesh. It can be molded with a high degree of precision and offers a firmer support to the shoe than the conventional shanks. Its use has aided Company VI in moving toward the preassembly manufacturing of standard parts, which results in labor savings and reduced inventory.

(3) The introduction of neoprene cements in Europe. Company researchers conducted experiments to determine the best uses of these cements and the factors that caused failures. From this work, strict manufacturing control procedures were developed. Cements are now used extensively and have made possible the development of very lightweight and flexible shoes.

(4) Approximately 20 percent of the company's production machines are produced in its own machine shop. Research is conducted on machines for shoemaking, last turning, and testing. The machine-manufacturing facility was established because the existing suppliers did not produce what they needed.

(5) Testing machines for determining the performance of a shoe under actual wear conditions. This has long been a prime research activity, and several developments have been patented and are now recognized as testing standards throughout the world.

(6) The development of purchasing standards and specifications. After tests on materials are completed, the Research Department issues a report to the Purchasing Department. If the material is acceptable, the report specifies the purposes for which the material can be used. The report also describes the applications for which the material has failed to meet company standards. All reports are oriented toward predicting how a material will stand up during the manufacturing process and how it will endure in the finished shoe. This information provides a very useful guideline to the designers in the creation of new styles.

Research Payoff

The research program has provided benefits principally in (1) reduced losses due to failure of shoes after they are sold to the customer; (2) ability to take a calculated risk on the use of a new material before competitors are able to use it; (3) advice to designers and stylists in creating new types of shoes with greater merchandising appeal; (4) cost savings in manufacturing through the use of new techniques and materials; (5) creation of diversification opportunities – for example, a line of chemical-adhesive products developed by the Research Department are sold to the building, metals, and paper industries.

The following comments were made by the Research Director concerning the company's research philosophy.

"We are not interested in the pure science factors of how much moisture or pressure a leather or material will take, but rather what will be its actual performance on the foot."

"We like our scientists and engineers to keep in close contact with the practical application of their work."

"In transferring research results to the factory, it is best to introduce a new process or material in one location and get it firmly established before moving on to the next factory."

"Whereas research has become a necessity to our industry, this research must be guided to be in conformity with the market. Yet, as research points into the future, who is going to tell us what the future market will be? Therefore, if we want to deal with the problem of research competently and completely, we will eventually have to include motivation research in our program. For many of us this may at this time seem to be farfetched, but as I said before, research must not only help us to improve productivity and reduce manufacturing cost, it should primarily help us to sell more shoes and at a better price. These prospects and potentials should be tempting enough to the shoe manufacturer, and induce him to attribute to research the importance it deserves."

Company executives believe the following areas of technology require additional investigation:

- Cause of failure in the finished shoe
- Better methods and machines for testing materials and finished shoes
- Better upper-making machines
- Postfinishing of shoes.

They believe that progress in shoe production will depend more on chemical aspects and development of new components and materials than on machines.

The Research Director concluded:

"Automation will be limited in the European shoe industry because European companies, at this time, do not have large-volume domestic markets to which mass production methods can be applied. The emphasis will continue to be on materials and construction."

APPENDIX C

SATRA

THE BRITISH SHOE AND ALLIED TRADES RESEARCH ASSOCIATION

SATRA is the oldest and largest shoe-industry cooperative research association in the world. Analysis of SATRA is a logical major step in exploring possibilities for cooperative research in the United States shoe industry.

To assess the merits of taking the SATRA approach or a modified-SATRA approach to industry research in the United States, it is necessary to: (1) examine the way in which SATRA is structured; and (2) assess SATRA's achievements.

SATRA: Structure

The British Research Association Program

The creation of the Department of Scientific and Industrial Research (D. S. I. R.) in 1916 was the fundamental legislative step leading to the development of the British system of Research Associations. The new department was empowered "to institute specific research, to establish or develop special institutions, or departments of existing institutions, for the scientific study of problems affecting industries and trades and to establish and award Research Fellowships".

One of the first actions of the new department was the institution of measures to encourage industrial research through the promise of grants to "Approved Associations for Research", provided the associations were founded and maintained by industry. Eligible associations had to be nonprofit, have as their main objective the conduct of research for a specified industry or group of industries, and be governed by a council elected from the membership. Government support in the form of grants was made available to the associations, to be used for general purposes rather than for specific research projects. The associations were to be subscribed to by member companies and operated independently of Government.

By 1917, a fund of £1 million had been set aside for grants, a model "Memorandum and Articles of the Research Association" drawn up, and the scheme for promoting industrial research publicized. The first RA (Research Association) was established in 1918. Today, some 50 RA's are actively operating in the United Kingdom and represent most major industries.*

Government Grants. Since 1917, grant policies under the British RA scheme have undergone many modifications. It was originally intended that Government support would be merely a pump-priming allocation to help establish and maintain the associations for about 5 years, with Government matching industry's contributions on a

*For a general review of the British Research Associations see Symonds, C. E., Research Associations for Industry, Ontario Research Foundation, Toronto, Canada (1965).

fifty-fifty basis. However, the British Government has never been able to completely withdraw support from the Research Associations. After several modifications, Government funds now are provided on the basis that the industry must raise a specified minimum amount before the Government grant is available. The ratio of industry funds to Government funds varies with the industry but never exceeds 50:50.

The Government grants are usually made on a 5-year basis, provided the Research Association presents an acceptable program. Acceptable programs are defined as those that benefit the public through the maintenance or improvement of the industry's competitive position, both domestically and internationally. Favorable consideration is also given to those Associations whose work is of direct and obvious benefit to the economy at large.

An Association, in accepting a grant from the Government, is not restricted to using the money for specific projects, nor does it have to account for the use of the funds. In this sense the grant is not given under a legal contract. The grant is given for general purposes, and is subject only to standard terms and conditions of a minimal nature. Historically, the Government has inquired into the uses when it was apparent that the Association's program was not functioning as planned. In order to force the Associations to grow and at least achieve a minimum size, the required industry contributions have been raised over a period of time.

In addition to basic revenue grants, the Government found it desirable to make certain "special-assistance" grants. These special grants have been established to assist in better application of research results within the industry. During the period 1961-1965, approximately £250,000 was spent for the extension or improvement of information and liaison services. In 1962, the ear-marked grant was established for specific research projects. These are usually projects of a long-term or speculative nature or for those from which the nation as a whole, rather than a particular industry, stands to benefit. In several cases the Government assumed the entire cost of these projects.

Industry Contributions. Membership dues are generally proportional to the size of the individual member. Subscription rates are always ratified by membership at a general meeting. Block subscriptions from trade associations and subscriptions of associate members are usually negotiated. Various methods are used to relate the amount of subscription to the member company's size. The most common of these methods include levies on volume of production or productive capacity, on number of employees, on wages, or on sales revenue. The relative amounts allocated may be on a direct linear scale, or they may be reductive, with a fixed maximum for any one member. All statutory levies so far are strictly linear and have no maxima; they are not paid directly to the RA, but through a Government department (the Board of Trade) or through a development council.

The prime interests and activities of most RA's are geared to accommodate the technological requirements of the main producing firms and the closely related user and supplier firms of the industry. It has been found in practice that if membership is extended to cover both the more remote users and suppliers, the RAs' activities tend to become restricted.

Services to Members. The basic function of each RA is to bring science to its supporting industry by all possible means. For this reason, the RA must have not only a laboratory staff to undertake research tasks, but also people qualified to explain the results of research to members and to help in its application. Many RA's now accept the added responsibility for training industrial supervisors and for the education of management on the value of science to industry. Also, to some extent, some nontraditional types of research such as health and safety studies, operations research, and industrial economics are now being accepted as suitable activities for RA's.

Much of an RA's work is directed toward increasing the industry's productivity, modifying existing processes, finding new raw materials, and developing standards.

A breakdown of the average distribution of effort within RA's is shown below:

- 19 percent on cooperative basic research
- 51 percent on cooperative applied research, etc.
- 19 percent on information and other member services
- 11 percent on sponsored work for industry or for Government.

The "basic research" carried out at the RA's usually has a specific purpose and is stimulated by practical need in a field of potential application. This type of research is considered important to an RA's program not only because it helps provide the answers to the industry's long-term problems, but also because it helps satisfy the professional requirements of a high-calibre scientific staff.

Applied research projects arise as a result of the recognition of existing technological problems. These applied-research projects vary in importance; some are short-term and some occupy a more or less permanent place in the RA's program. Normally, applied projects are carried to the prototype stage or to the stage where the procedure can be incorporated in the members' operations. Very little product-development work is done at the RA; this is usually done in the members' plants.

Each RA operates a variety of services to channel the results of research and other information to its members. These may be classified generally as information services, liaison services, and public-relations services. The proportion of effort devoted to such services by the different RA's varies from 6 to 60 percent, the average being 19 percent, as shown above.

Information Services. All RA's run a library and an information service for the membership. Frequently, a translation service and an abstract service are also provided. The answering of technical inquiries is a substantial activity. Inquiries range from the very simple to the very complex, and sometimes involve some laboratory work. Occasionally, inquiries require lengthy investigation and, when appropriate, become part of the applied-research program. In providing consulting services, RA's are careful not to infringe upon the services provided by professional consultants.

Liaison and Public Relations. The demand for liaison is said to be increasing, and D.S.I.R. has, during the past few years, provided special grants to RA's for this purpose. Liaison services are usually undertaken by a specially trained liaison staff, but the present trend is for research-staff personnel also to take part in this activity.

To expedite these services, some RA's have opened "field offices" to serve regional interests, and some RA's have acquired mobile laboratories to demonstrate new techniques and for convenient servicing of some members' problems. These liaison activities are closely tied in with the general public-relations activities of an RA. Field demonstrations, speaking engagements, seminars and conferences, as well as printed brochures, technical literature, etc., are all members' services usually provided by the RA. Frequently, research staff members lecture at technical colleges and scientific societies.

Sponsored work for industry and for Government is dealt with separately in the next two sections.

General Sponsored Work. In RA terminology, "repayment work" includes all work for which a charge is made, whether or not it covers the whole cost of the work. It includes (1) general member services, (2) work for Government departments, (3) work for other agencies, and (4) confidential sponsored work for individual members.

General member services cover a wide range and can be classified roughly as services that draw upon the existing knowledge and facilities of the RA. They range from occasional routine testing to the use of specialized RA equipment. The older the RA the greater is the variety of such services.

Work for Government departments forms the bulk of all sponsored work at RA's. The majority of contracts are from the Ministry of Aviation and the War Office. An appreciable amount of Government work is applicable to civil industry, and the results are usually published openly.

Other agencies sponsoring work at RA's include the National Research Development Corporation* and agencies of foreign governments. Relatively few contracts from the N.R.D.C. are placed at RA's; but they are expected to increase in the future. Contracts have been placed with RA's by the United States Army, the United States National Aeronautics and Space Administration, and others. Research programs are also conducted for United States or international trade and research organizations.

Confidential Contract Research for Industry. In 1958, D.S.I.R. encouraged RA's to undertake confidential contract research for industry, largely because of the growing volume of sponsored work being placed abroad by United Kingdom manufacturers as a result of the limited laboratory resources for this work in the United Kingdom.

The majority of RA Directors are opposed to the undertaking of confidential work because they feel that such work is incompatible with the normal cooperative research carried on at the RA.

The general conclusion is that any growth in the volume of confidential sponsored work is likely to be slow in the majority of associations.

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*The National Research Development Corporation, set up under the Development of Inventions Act 1948, is a quasi-Government body. Its main function is to develop inventions arising from public research institutions (excluding the atomic-energy field) and to help private inventors and industry develop their inventions to the stage of commercial exploitation if this is in the national interest and if no development would otherwise occur. It also has powers to support research projects where these are likely to lead to development of new machines, products, or processes.

Patent Rights and Exploitation. Although almost all of the RAs' work yields information of value to members, very little is "invention" in the patent sense. When such cases do arise, RA's are required to obtain D.S.I.R.'s consent before applying for a British or a foreign patent. D.S.I.R. has the right to determine whether the patent is of interest to other industries and to see that the invention is made available to them on fair and reasonable terms.

The five general methods listed by D.S.I.R. as being used by the RA's for exploitation of patents are as follows:

(1) Direct licensing arrangements with members
(2) Licensing of one or more nonmembers
(3) Transfer to a development company owned or controlled by the RA
(4) Transfer to the National Research Development Corporation
(5) Direct manufacture by the RA.

Direct licensing of members is the most common method of exploitation when the invention falls within the members' manufacturing capabilities and interests. Occasionally, nonmembers' may also be licensed, in which case the royalty terms are more severe. The second method listed above is usually applied when the invention involves the production and marketing of an instrument, machine, or other product whose manufacture is outside the scope of the industry served.

Three RA's have set up separate development companies to exploit patents. The chief purpose of such companies is to enable the association to keep commercial activities separate from research while still retaining control over such activities.

SATRA By-Laws and Articles of Incorporation

The following is an abstract of the key phrases and clauses of SATRA's "Memorandum and Articles of the Research Association" that will quickly provide the reader with the essentials of the legal framework under which SATRA is organized and presently operates.

ABSTRACT OF MEMORANDUM AND ARTICLES OF THE RESEARCH ASSOCIATION*

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M E M O R A N D U M

3. Objects:

(A) To promote research and other Scientific Work in connection with the Footwear Trade and Allied Industries. To establish and maintain laboratories, workshops or factories for the purpose. To encourage and improve the education of persons engaged in the said industries.

*"Notes on Membership 1966-1970", SATRA, (1966) pp 12-15.

(B) To prepare, or acquire, print and publish books, papers, periodicals and other literary undertakings bearing on the trades and industries. To establish museums, collections of inventions, libraries, etc.

(C) To employ skilled professional or technical workers. To endow scholarships and bursaries for the remuneration, instruction and support of students of said trades. To employ and remunerate instructors for such students.

(D) To encourage the discovery of, and investigate and make known the nature of inventions, processes, materials, etc., which are being used or may seem capable of being used by Members of the Association or others. To take out, acquire or become sole or part owners of patents or licenses relating to such inventions. To develop, improve, perfect and test the value of inventions, etc., by manufacturing, exhibiting and placing on the market any article or substances to which same may be capable of applications.

(E) To apply to Government Departments, Local Government Authorities or other public bodies or to corporations, companies or persons for, and to accept grants of money, land, donations, gifts, subscriptions and other assistance for promoting the objects of the Association, and to discuss and negotiate with them and with the Ministry of Technology* schemes of research and other work and matters within the objects of the Association and to conform to any proper conditions upon which such grants and other payments may be made.

4. The income and property of the Association, whencesoever derived, shall be applied solely towards the promotion of the objects of the Association and no portion thereof shall be paid or transferred directly or indirectly by way of dividend, gift, division, bonus or otherwise howsoever by way of profit to the Members of the Association.

7. The liability of the Members is limited.

8. Every Member of the Association undertakes to contribute to the assets of the Association, in the event of same being wound up for the payment of liabilities of the Association such amount as may be required not exceeding £5.

*In 1965, the name, "Department of Scientific and Industrial Research" was changed to the "Ministry of Technology". The staff and functions remained essentially the same.

ARTICLES

Article 5.

Membership of the Association consists of persons or corporations with the following status:

A. Ordinary Members.

B. Foreign Members (being persons or corporations who would be eligible for Ordinary Membership if they - or the control or their business - were not outside the U.K. and the Commonwealth).

C. Associate Members (under which category are included persons, corporations, boot and shoe schools and colleges and other organizations connected with the shoe and allied trades).

D. Honorary Members, being persons nominated by the Council for special services or for special cause, and elected at a General Meeting.

Article 7.

No Member, other than an Ordinary Member, shall be entitled to vote at General Meetings. Members other than Ordinary Members shall be entitled to such of the privileges and benefits of the Association as the Council may from time to time determine.

Article 8.

No firm or other unincorporated association may as such become a Member of the Association, but if any firm or other unincorporated association should desire to obtain the advantages of membership it shall nominate one of its members to act as its representative and exercise the rights of membership on its behalf.

Article 14 gives the Council absolute discretion in deciding whether or not an application for membership shall be accepted.

Articles 15 and 16 define the conditions to be observed on resignation from membership.

Article 18 defines the procedure to be followed by the Council to remove a member of the Association.

Article 19 makes the point that the rights of the member are personal and are not transferable.

Article 22 defines the terms and conditions governing the duties of members, including:

22(a) The payment of agreed fees and subscriptions,

22(b) The observance of the Memorandum and Articles of the Research Association and all bylaws, rules, and regulations of the Association for the time being in force,

22(c) The payment and making good to the Association of loss or damage sustained by the willful act or default of a member,

22(d) The requirement that the member and his employees shall treat as strictly confidential the information (not being common knowledge or openly published elsewhere) obtained by virtue of membership and shall undertake not to communicate such information to a nonmember without the written consent of the Association.

Articles 23 and 24 specify that the business of the Association shall be managed by a Council and that no person shall be eligible to serve on the Council who is not a British subject resident in the United Kingdom.

Articles 25 to 35 cover the constitution of the Council and, briefly stated, provide for it to consist of

(i) Not more than 40 nor fewer than 12 members elected in General Meeting (one-third retiring each year, but the Council having power to fill a casual vacancy);

(ii) Not more than 12 co-opted members provided that, at any one time, co-opted members number not more than one-quarter of the total of elected and co-opted members;

(iii) Members (not more than 3) appointed by the Ministry of Technology.

Article 38 defines the general powers of the Council in the following terms:

"The Council shall have sole control in regard to all matters relating to the management and organization of the Association. In addition to the powers and authorities by these presents or otherwise expressly conferred upon them, they may exercise all such powers and do all such acts and things as may be exercised or done by the Association and are not hereby or by status expressly directed or required to be exercised or done by the Association in General Meeting, but subject nevertheless to the provisions of any Acts of Parliament for the time being in force and of these presents."

SATRA Organization

An organization chart of SATRA is shown in Figure C-1. The principal organizational segments are the Council, the Director and his Administrative staff, and the Research staff. A brief description of the nature and function of each segment is presented below.

The Council. SATRA is governed by its Council, consisting of 46 members: 45 representing the memberships, and 1 representative appointed by the Ministry of Technology on behalf of the Government. Council members serve without pay and are elected for a 3-year term. Of the 45 membership representatives, 37 are elected and 9 are co-opted. The British Government has been extremely careful to avoid any suggestion of Government interference in SATRA activities.

The Government representative serves as a nonvoting member in an advisory capacity only and provides the main link between SATRA and the Government. Also included among the nine co-opted members are four Trade Union representatives. Union representation on the Councils of Research Associations is encouraged to facilitate introduction of technological change into the industry.

As shown in Figure C-1, the Council is divided into three committees: Finance and Executive, Scientific, and Industrial.

The Finance and Executive Committee is concerned primarily with overall policy and financial matters. Questions concerning the admittance of foreign members, the disposition and exploitation of potential SATRA developments, and the operating-budget approval were typical areas of concern to this Committee during 1964.

The Scientific Committee's main functions are to supervise and provide general guidance on the work carried out in the laboratories and to help the research staff formulate new research programs. This Committee consists of 24 members, with responsibilities for specific programs assigned to each individual.

The Industrial Committee is concerned principally with production improvement for the industry. During 1964, this Committee was instrumental in obtaining a special grant for the establishment and support of a computer facility at SATRA and a research program to develop shoe-industry applications of the computer.

The Director and His Staff. The Director is the focal point for the performance of research programs and the salability of results to the industry. As such, he must not only be a good administrator but also devote considerable time to "public-relations" activities among the membership. A review of several RA's showed that their success in obtaining financial support from their members was highly dependent upon the personal abilities and efforts of the research director.

The Research Staff. The research staff consists of 113 researchers and 3 research supervisors. The research staff is divided into 10 groups identified by scientific disciplines (e.g., chemistry) or by the nature of the work (e.g., physical testing).

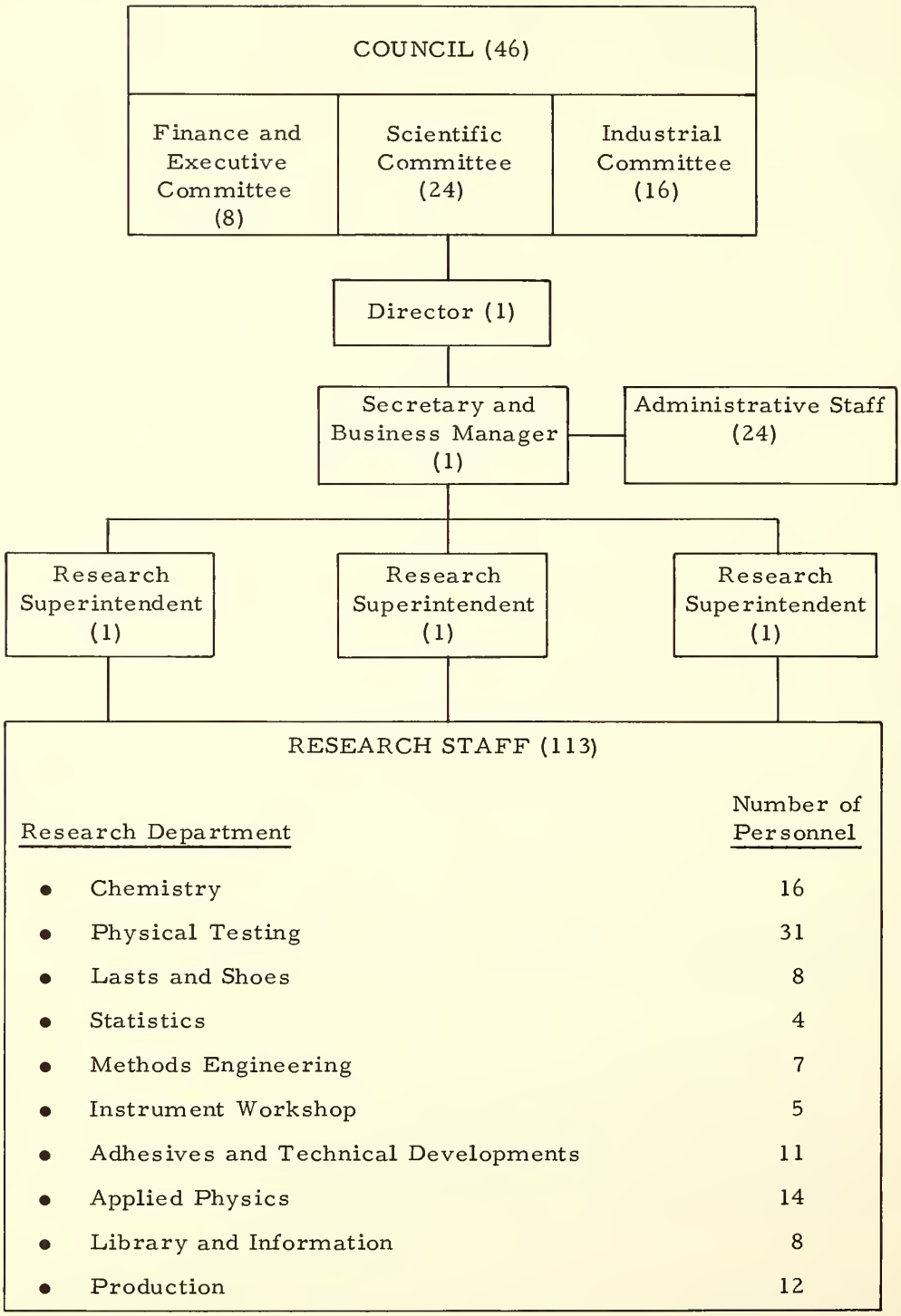

FIGURE C-1. THE SATRA ORGANIZATION

Figures in parentheses indicate number of persons.

The staff is composed of four levels of authority based primarily on experience, education, and job responsibility. The levels of authority are listed below in ascending order:

I Assistant
II Research Staff Member
III Research Officer
IV Department Head and/or Senior Research Officer.

Table C-1 is a breakdown of personnel by department and by authority level. The Physical Testing, Chemistry, Applied Physics, and Production Department account for over 60 percent of the total research staff. Approximately 25 percent of the research staff have earned college or university degrees.

TABLE C-1. PERSONNEL BREAKDOWN OF SATRA RESEARCH DEPARTMENTS

Research Department	Department Head and Senior Research Officer	Research Officers	Research Staff Members	Assistants	Total Personnel	Percent of Total
Chemistry	2	2	1	11	16	13.8
Physical Testing	1	5	8	17	31	26.7
Lasts and Shoes	1	2	1	4	8	6.9
Statistics	2	0	1	1	4	3.5
Methods Engineer	1	2	4	--	7	6
Instrument Workshop	1	--	4	--	5	4.3
Adhesives and Technical Developments	1	4	1	5	11	
Applied Physics	1	7	2	4	14	12
Library and Information	1	3	1	3	8	6.9
Production	1	7	1	3	12	10.3
Total Personnel	12	32	24	48	116	100.0

Source: SATRA Council Annual Report-1964.

The Membership

The membership of SATRA is divided into four major categories: (1) United Kingdom Group Members (principal shoe and leather trade associations), (2) United Kingdom Direct Members (private British companies in the shoe and allied trades), (3) Overseas Members (both Group and Direct members in non-British countries), and (4) Affiliated Members (schools and unions). Table C-2 presents a tabulation of members in these various categories. At the end of 1964, SATRA counted 1,079 organizations as members. This represented about 90 percent of all United Kingdom shoe manufacturers and a high percent of the manufacturers in the allied trades. In the Group category, a membership in the trade association automatically becomes a membership in SATRA.

The Direct Members category is composed mostly of "allied trades" manufacturers. Table C-2 shows the subcategories of the allied trades.

TABLE C-2. SATRA MEMBERS

Type of Membership		1963	1964
U. K. GROUP MEMBERSHIP			
British Footwear Manufacturers' Federation		352	346
Lancashire Footwear Manufacturers' Association		48	45
Multiple Shoe Retailers' Association		52	51
		452	442
U. K. DIRECT MEMBERSHIP			
Footwear Manufacturers		25	26
Footwear Distributors		40	42
Rubber and Plastics Trade		66	66
Leather Trade		86	86
Adhesives, Finishes, Polishes, etc.		38	38
Board and Stiffener Manufacturers		14	13
Threads, Fabrics, Mercery, and Sundries		110	115
Last Makers		8	9
Engineers		32	35
		419	430
OVERSEAS MEMBERSHIP			
Commonwealth and Ireland		107	124(a)
Foreign (Subject to ratification)	SATRA-VERIS group	--	40
	Others	32	43
		139	207
Grand Total		1,010	1,079

AFFILIATIONS

The National Union of Boot and Shoe Operatives
Rossendale Union of Boot, Shoe and Slipper Operatives
St. Crispin's Boot Trades Association
The New Zealand Leather and Shoe Research Association
The Wholesale Footwear Distributors' Association
The Cut Sole Association

(a) Includes 26 shoe manufacturers in Eire now in Group membership through the Irish Footwear Adaptation Association. (Eleven of them were previously direct SATRA Members.)

The Overseas category was established in 1963 when SATRA's Articles of Association were changed to allow the admittance of foreign firms and associations. A foreign firm is defined as one that (1) is located outside the United Kingdom and the Commonwealth, or (2) has 51 percent or more of its capital under "foreign" control. Membership in SATRA now includes manufacturers and suppliers from the United States, Canada, Ireland, Sweden, Norway, Denmark, Holland, Germany, France, Switzerland, South Africa, Rhodesia, Australia, and New Zealand. An agreement was reached in 1964 with the Irish Footwear Adaptation Association for a group membership of all shoe-manufacturing firms in Ireland. Another agreement was made in 1965 with VERIS (Vereniging voor Research en Informatie in de Schoenindustrie), whereby a group membership of over 50 Dutch firms could participate in SATRA. Affiliation negotiations have been considered with groups in New Zealand and Canada; however, by early 1966 no final action had been taken.

The fourth membership category – Affiliated Members – includes schools and trade associations with an interest in shoes and leather manufacturing; they make annual contributions to SATRA and enjoy full membership rights.

The Sources of Income

Table C-3 shows the principal sources of SATRA income for 1963 and 1964. The total income was £154,560 ($433,000) in 1964.

TABLE C-3. SATRA INCOME SOURCES IN 1963 AND 1964

Source of Income	Income, £ 1963	1964
Subscription Income		
British Footwear Manufacturers' Federation	44,200	50,000
Lancashire Footwear Manufacturers' Association	6,000	6,000
Multiple Shoe Retailers' Association	1,125	1,125
Wholesale Footwear Distributors' Association	400	400
National Union of Boot and Shoe Operatives	563	563
Other Affiliations	175	175
Direct Membership	22,622	23,117
Donations	1,828	2,545
Total "Industrial" or grant-earning income	76,913	83,925
Government grant through D.S.I.R.	33,105	36,255
Overseas subscriptions	9,337	19,670
	119,355	139,850
Other	23,349	14,710
Total	142,704	154,560

As shown in Table C-4, the "Industrial" income (from shoe and shoe-supplier manufacturers, trade associations, and others) was about 54 percent of total income for 1963 and 1964. The Government grant, which was based on the industrial income, was approximately 23 percent of total income.

TABLE C-4. PERCENT SATRA TOTAL INCOME BY MAJOR SOURCE

	1963, percent	1964, percent
Industrial Subscription (Shoe and supplier manufacturers, trade associations, others)	53.9	54.3
Government Grant	23.2	23.4
Overseas Subscriptions	6.5	12.7
Other	16.3	9.5
Total	99.9	99.9

Table C-5 shows that the Government Grant was a constant 30.1 percent of the Industrial Subscriptions for 1963 and 1964.

TABLE C-5. RELATIONSHIP OF INDUSTRIAL AND GOVERNMENT CONTRIBUTIONS

	1963, percent	1964, percent
Industrial Subscriptions	69.9	69.9
Government Grant	30.1	30.1
Total (Industry and Government)	100.0	100.0

Basis on Which Subscriptions are Calculated. New members in SATRA are accepted for a minimum period of 5 years. Withdrawal after that time is permitted if "appropriate" notice is given. The annual subscription rates are calculated on a different basis for each category of manufacturers as shown below:

(1) U. K. Shoe Manufacturers

(a) If a manufacturer is a member of the British Footwear Manufacturers' Federation or the Lancashire Footwear Manufacturers Association, the annual subscription is equal to the number of total employees times $2.51 per employee per year. For a firm employing 100 employees, the cost of belonging to SATRA would be $251.00 per year. For members of these two associations, there is no minimum fee. A slight reduction is given these associations because of a longer-term commitment and the ease of collecting fees in a single payment.

(b) For United Kingdom shoe manufacturers who are not members of the above associations, the subscription is approximately $2.80 per employee per year, with a minimum fee of $140 per firm.

(2) Foreign Shoe Manufacturers

Foreign shoe manufacturers are assessed at the rate of $2.51 per employee per year with a minimum fee of $140.

(3) Rubber Footwear Manufacturers

For all manufacturers of rubber footwear, both in the United Kingdom and foreign countries, the subscription fee is based on a rate of $1.25 per employee per year, with a minimum fee of $140 per firm.

(4) "Allied Trades" Manufacturers

Manufacturers in the "allied trades", both United States and foreign, are assessed on a negotiated and individual basis depending on the firm's size and possible benefits from SATRA research programs. A minimum fee of $140 is applied to all companies.

As shown in Table C-6, SATRA has "earned" approximately 16.5 percent of total income during the last 5 years. This earned income resulted from royalties from patents, consulting services, equipment sales, etc. While significant in total magnitude, this revenue has been sporadic and cannot be predicted accurately.

TABLE C-6. SATRA INCOME FROM 1960 TO 1965

	Income, £ (Round Figures)	Percent
Federation and Lancashire Association	240,000	34.0
Other U. K. Subscriptions	112,000	15.8
Donations	9,000	1.2
Government Grant	164,000	23.3
Overseas Contributions	63,000	9.0
SATRA's Own Earnings	116,000	16.7
Total	704,000	100.0

A combination of rising research costs and slower growth in memberships has caused SATRA expenditures to move ahead of income. This unfavorable income-expenditure balance forced the SATRA Council to raise membership rates by 50 percent (from $1.54/production worker to approximately $2.51/production worker), and to re-evaluate the charge rates for various services. SATRA has also asked the Ministry of Technology to increase the grant from 30 percent to 45 percent of United Kingdom industry contributions. If these measures are not effective, the services and/or research program will have to be restricted.

Cooperation With Other Shoe-Research Organizations

SATRA has followed a policy of cooperating with other research organizations and has been instrumental in establishing organizations in other countries. Table C-7 contains a list of research organizations associated with shoe and leather industries in foreign countries throughout the world. SATRA was instrumental in establishing the South African, Belgian, Swedish, and New Zealand organizations by offering advice and training the original cadre of senior staff members.

TABLE C-7. FOOTWEAR RESEARCH ORGANIZATIONS

Country	Name of Organization
	Europe
Belgium	Centre de Recherche du Cuir (Leather Research Centre), 13, rue de Hollande, Brussels
Denmark	Skoindustriens Forskningsinstitut, Orebro
France	Centre Technique du Cuir (Technical Research Centre for Leather), 181, avenue J. Jaures, Lyons
Germany	Pruf- und Forschungsinstitut für die Schuhherstellung (Testing and Research Institute for the Footwear Industry), Pirmasens
Netherlands	Lederinstituut TNO, Waalwijk
	Vereniging voor Technische Research en Informatie in de Schoenindustrie (VERIS), Willem II straat 47-49, Tilburg
	Commissie voor de Produktiviteivsbevordering in de Schoenindustrie, Willem II straat 47-49, Tilburg
Norway	Skoindustriens Forskningsinstitut, Orebro
Sweden	Skoindustriens Forskningsinstitut, Orebro
United Kingdom	Shoe and Allied Trades Research Associations (SATRA), SATRA House, Rockingham Road, Kettering, Northants
	Other
South Africa	Leather Industries Research Institute, Grahamstown, South Africa
New Zealand	New Zealand Leather and Shoe Research Association, Lower Hutt, New Zealand

Source: The Hides, Skins, and Footwear Industry in OECD Countries: 1963-1964, Organization for Economic Cooperation and Development.

SATRA: Accomplishments

The SATRA Research Program

The nature and results of SATRA research programs are of a proprietary nature and cannot be disclosed to nonmembers. Table C-8 presents a partial list of titles of research projects that were active during 1964.* It is apparent from a list as broad and comprehensive as this that the probability of a member finding some profit-increasing opportunities is extremely high.

It is impossible to account for all of SATRA's work in such a manner that the economic payoff can be precisely calculated and compared with the costs. However, a qualitative approach gives an indication that many advancements have been made that have benefited the British shoe industry as well as individual companies. During the last 5 years (through 1965), approximately £660,000 ($1,850,000) were expended on all activities. SATRA's achievements resulting from these expenditures may be generally classified into three major groups: materials, manufacturing, and product.

Materials. The British shoe-manufacturing industry annually purchases well over £100,000,000 ($280,000,000) worth of materials and components. SATRA's work helps to minimize waste in this expenditure by establishing quality targets, grades, and specifications to guide the supplying industries in their development work and to guide the shoe-factory personnel in their purchasing appropriately to their product.** With the rapid expansion of new materials, SATRA has played an important role in integrating the new materials and their associated methods into the industry on a scientific basis, rather than by trial-and-error methods.

This research work benefits suppliers as well as shoe manufacturers. Because of the magnitude of the materials market, a small percentage improvement will produce a significant payback on the investment in SATRA. The following examples illustrate this point.

Assume that about one-third of SATRA expenditures over the last 5 years can be allocated to materials and components. Therefore:

$$\frac{£660,000}{3} = £220,000 \text{ materials expenditures.}$$

Over the same period, the industry purchased over £500,000,000 of materials and components. In order to recover the research investment, an improvement in efficiency of only 0.044 percent – only four ten-thousandths – would have to be achieved. That is,

$$\frac{220,000}{500,000,000} = 0.044 \text{ percent}$$

*SATRA Council's Annual Report for 1964.

**Bradley, Harry, "The British Boot, Shoe, and Allied Trades Research Association", Nature, Vol. 193, January 27, 1962, p 330.

TABLE C-8. A LIST OF 1964 RESEARCH PROJECTS

Lasts and Shoes

- Developed new men's, women's, and children's last shapes
- Safety shoe last shape, steel caps
- Foot-measurement program
- Comfort feature in shoes with synthetic uppers
- Analysis of consumer complaint problems
- Wear trial program
- "Special types of footwear" standards

Statistics

- In-stock inventory control by computers[a]
- Started computer center[a]
- Size standardization
- Supply of upper leather – How to cut delivery time

Physical Testing and Consulting

- Consulted on 3,000 problem requests
- Development of test methods and standards
- Evaluation of synthetic upper materials, soling materials, fiber boards, threads, and other components

Chemistry

- Use of new instrumentation (gas chromatography, IR spectrometry)
- Post finishes and methods
- Biology and microbiology (effects of perspiration, rot)
- Toxicity of solvents
- Material specifications

Adhesives and Technical Development

- Consulting on 1,500 requests
- Adhesive testing
- Problems in attaining better adhesion (surface contamination, material compatibility, priming materials)
- Methods of attaining more economical adhesion – force drying, molding rubber to plastic, injection molding; how to make cheaper molds, dielectric welding

Applied Physics-Process Development

- Heat setting
  - Faster rates
  - Synthetic materials
- Mulling
- Pattern cutting
- Preforming parts

TABLE C-8. (Continued)

Product Development

- Foot comfort – large scale test to compare leather, permeable and nonpermeable materials
- Performance of shoes in wear
- Evaluation of nonleather uppers
- Physical properties of leather

Methods Engineering

Equipment and Methods Development for:

- Moist heat setting and cyclic mulling
- Preforming uppers
- Vacuum forming
- Closing room transporters
- Lighting needs in the clicking room, leather inspection
- Cement drying and air presses

Instrument Engineering

- Dome plasticity apparatus
- Fiberboard scuff tester
- Last contourgraph
- Adhesive force drying apparatus
- Stretch flexing machine

Production Department

- Operative training courses
  - Instructors
  - Management
  - Foremen
- Factory surveys and implementation program
  - Better layout and workflow
  - Organization
  - Quality improvement

Library and Information Services

- Compilation of world literature on shoe-making
- Abstract service
- Translation service

(a) SATRA computer studies. Under a $126,000 grant from the British Ministry of Technology, SATRA has established a 3-year project to study the application of electronic data processing to the footwear manufacturing industry. The study will cover production planning, stock control, customer-order processing, and bookkeeping applications. A group of six people will staff the project.

However, assume that a conservative 5 percent of the total expenditure was considered "saved" through more efficient usage. The payback in the research investment is:

$$\frac{£500,000,000 \times 5 \text{ percent}}{£220,000} = \frac{25,000,000}{220,000} = 11,400 \text{ percent.}$$

Manufacturing. SATRA has emphasized research in equipment and methods to improve shoe-production efficiency. During the last few years SATRA has been directly responsible for important developments in transporters, heat setting, cyclic melting, forepart preforming, and sectional pattern cutting. SATRA has also achieved important results in various aspects of work study, operative training methods, process-control and quality-improvement systems, production planning and work loading, and many cases of factory reorganization in individual member companies.

Product. SATRA has had outstanding success in developing new concepts and standards in children's, industrial, and special-purpose shoes. Attention has been given to problems in biomechanics, biophysics, psychology, and anthropometry (body measurements). In addition, SATRA has dealt with approximately 5,000 complaints consumers have made about individual manufacturers products.

Favorable comments regarding SATRA's effectiveness were heard in interviews with British shoe manufacturers. The impact of SATRA's research programs is very difficult to assess, but the very high percentage of continuing memberships by British shoe manufacturers and their suppliers is a positive indication that their investment in SATRA programs has a satisfactory payoff.

SATRA's reputation with other shoe manufacturers in Europe varies from excellent to good, with a majority of executives interviewed rating their work very highly. There is no doubt that SATRA has achieved its aim of being the "focal point of progressiveness" in the British shoe industry and perhaps in the Western World.

In an interview with a research director of a leading British shoe manufacturer, the following question was asked: "Since you have a very sophisticated and well-equipped research laboratory, how do you justify being a member of SATRA?" The answer came back as follows:

"There are three principal areas in the shoe research spectrum:

(1) Academic or basic research where fundamental knowledge is being acquired.

(2) Research on common problems that all companies are facing.

(3) Research on problems of specific interest to an individual company.

[These three areas are depicted in Figure C-2.]

FIGURE C-2. THE SHOE-RESEARCH-PROBLEM SPECTRUM

"Our corporate research activities are concentrated on problems that will provide economic breakthroughs for our company. SATRA provides a tremendous backup to our efforts. For example, we make extensive use of their materials testing and library, biographical, and reference services. They are, in effect, an extension of our activities. We get our money's worth because we ask them a lot of questions and we get a lot of answers. We don't just wait for their reports, we try to get them to activate programs that provide the information we need. They don't know everything we are doing but we know what they are doing."

APPENDIX D

GOVERNMENT ASSISTANCE PROGRAMS

Department of Commerce, Voluntary Product-Standards Program

In December, 1965, Mr. J. Herbert Holloman, Assistant Secretary for Science and Technology announced the guidelines for the development of the Voluntary Product-Standards program.* This is a program in which the Department of Commerce aids an industry or an industry group in the development of standards, through cooperation with producers, distributors, users, and consumers. The principal purpose of this program is to allow an industry to enjoy the advantages and benefits of standardization. The Department of Commerce believes that economic growth is promoted through the reduction of production, inventory, and distribution costs. Standards, as defined, cover terms, classes, sizes, dimensions, capacities, quality levels, performance criteria, testing equipment, and test procedures. There are certain broad requirements that must be met for the Department of Commerce to participate in a voluntary standards program. These requirements are that the program:

(1) Not be contrary to public interest

(2) Have national effect or implications

(3) Have apparent industry-wide interest or endorsement

(4) Not be such that it can be processed according to the needs and desires of an industry by a nationally recognized private standards body.

Table D-1 outlines the respective rules of the Department of Commerce and the industries in working together to establish standards.

In essence, the Government acts as a coordinating body, providing an industry group with enough assistance to draft, obtain approval, and eventually publish the desired standards. The industry group maintains controls over the preparation of the standards document and its contents. The initiation of a Voluntary Standards Program for any products or class of products can be initiated by any group of manufacturers, distributors, consumers, users, or testing laboratories for any state or government agency concerned with a particular product. Request must be made formally in writing and must be signed by the representative of the group or agency and then forwarded to the Department of Commerce.

Table D-2 contains the minimum-requirement information that must be obtained in the formal request.

*Federal Register, 30 (238) (Friday, December 10, 1965).

TABLE D-1. THE ROLES OF GOVERNMENT AND INDUSTRY IN THE VOLUNTARY STANDARDS PROGRAM

The Role of Government	The Role of Industry
The Department, in responding to a specific request from industry, assists in the establishment of a voluntary standard by:	One or more segments of an industry contribute to the development of a voluntary standard by
(1) Acting as an unbiased coordinator in the development of the standard	(1) Initiating and participating in the development of a standard
(2) Providing editorial assistance in the preparation of the standard	(2) Providing technical counsel on a standard
(3) Supplying such assistance and review as is required to assure the technical soundness of the standard	(3) Promoting the use of, and support for, the standard
(4) Seeing that the standard is representative of the views of producers, distribuors, users, and consumers	
(5) Seeking satisfactory adjustment of valid points of disagreement	
(6) Publishing the standard	
(7) Establishing a hallmark that may be used on or for products that meet the requirements set forth in the standard	

Source: Federal Register, 30 (238), Friday, December 10, 1965, Title 15A-10.

TABLE D-2. VOLUNTARY STANDARDS PROGRAM FORMAL REQUEST INFORMATION

(1) Purpose and scope of suggested standards

(2) Statement of need and reasons for development through Department of Commerce procedures

(3) Statement of reasons why suggested standards are in public interest

(4) Available technical data essential to the suggested standard and its further development such as physical, mechanical, chemical, or performance requirements, and production figures for the common stock

(5) Other related information

(6) Names and addresses of members of the group making the request

The State Technical Services Act of 1965

General Statement

The State Technical Services Act of 1965 became law on September 14, 1965. Its purpose is to promote commerce and encourage economic growth by supporting state and interstate programs to place the findings of science usefully in the hands of the American enterprise.* Through this Act, the Congress has responded to the growing needs for stimulating a wide diffusion and more effective application of science and technology in business, commerce, and industry. Foreign competition and technological advance continue to be causes of concern for many firms as does lack of adequate economic growth in many regions. This Act is designed to meet these needs by supporting a program of incentive and assistance to the States and the appropriate institutions to provide technical services, so the industry can benefit from technology to its fullest extent.

In signing Public Law 89-182, President Johnson made the following comments:

> "This Bill will do for American businessmen what the great Agricultural Extension Service has done for the American farmer. It will put into their hands the latest ideas and methods, the fruits of research and development."

Provisions of the Act

There are two types of programs, the State Program and the Special Merit Program. The basic activity under this Act is provided through a series of State Programs of technical services. These programs are administered and coordinated by a "designated agency" chosen by the governor of each state. Two or more states may cooperate in coordinating their programs. In addition to the State Programs, the Act provides for supporting programs of special merit. These programs are carried out by qualified institutions and each program is administered by the Office of State Technical Services. These programs are intended to provide technical services that have brought regional or national significance, or employ techniques or methods that are not included in the state program.

State Programs. The State Technical Services program is designed to enable businessmen to acquire scientific engineering information more effectively. This can be accomplished through the preparation and dissemination of technical reports, abstracts, computer tapes, microfilm, and reviews of scientific and engineering information. Also provided in the Act is the establishment of state or interstate technical information services. These services provide a rapid service to identify sources of engineering and other scientific knowledge. It enables them to sponsor industrial workshop seminars, training programs, extension courses, demonstrations, and other activities that encourage the practical application of scientific and engineering information.

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*For more detailed information on the State Technical Services Act, see Federal Register, 30 (250), pp 16211-16216 (Wednesday, December 29, 1965).

Special Merit Programs. Special Merit Programs are carried out by qualified institutions and administered by the Office of State Technical Services. A Special Merit Program differs in significant respects from the State Program. Special Merit Programs are intended to attack special problems of broader scope that are common in more than one state and to provide support for new approaches or pilot ventures in the application of technology. Innovation and exploration of new areas of activity for the application of technology are encouraged. However, this Act specifically excludes the development of new knowledge, and market surveys and economic analysis are specifically excluded. In Special Merit Programs, as in state programs, all the Federal funds must be matched with non-Federal funds. Federal support cannot exceed 50 percent of any program costs. Non-Federal funds can come from state or from other non-Federal sources such as: contributions, donations, and gifts of money; and special user charges from persons, private profit or nonprofit firms, organizations, or institutions.

Proposals for Special Merit Programs are submitted directly to the Office of State Technical Services in Washington. They need not be submitted through a state's designated agency and must not be a part of the state's annual plan for technical services. These proposals must be approved by the United States Secretary of Commerce on the basis of available funding, the need for the project, the competence of the institution submitting the proposal, and the potential impact of benefits for the region and country as a whole. The specific content of a proposal for a Special Merit Program must contain the following minimum information:

(1) A concise statement of the objectives of the program

(2) A description of the proposed program, discussing the methods, techniques, and approaches to be used to meet the objectives

(3) A statement as to why the proposed program is of national, regional, or special significance and why it should be funded under the Special Merit Program

(4) If the proposal is submitted by a designated agency, an explanation should be included as to why this program was not included as part of the state plan. Proposals submitted by other institutions should include information as to whether this program had ever been submitted to the designated agency as a part of the state plan and, if so, an explanation of the action taken by the designated agency

(5) A detailed budget and plan of action for the proposed program

(6) A statement showing the availability of matching funds from state or other non-Federal sources (This statement must indicate the basis of this determination and must identify sources of funds.)

(7) A statement indicating the extent and manner in which the program was coordinated with other similar publicly supported activities within the state and other states (It should identify those programs and activities already under contract and indicate how any duplication of technical services has been avoided.)

(8) A certification that adequate ethical standards and rules to avoid any conflict of interest have been established

(9) A statement of the capabilities of the qualified institution, including facilities that will be required for the program.

IV

OPPORTUNITIES FOR INCREASING EXPORTS

by

J. R. Miller

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OPPORTUNITIES FOR INCREASING EXPORTS

by

J. R. Miller

EXECUTIVE SUMMARY

The shoe industry and the United States Department of Commerce have become concerned about the increasing volume of foreign shoe imports coming into the United States and the declining volume of American shoe exports. Nonrubber footwear exports in 1961 were 3,007,195 pairs of the 593,000,000 pairs produced; their value was $8,985,431. In 1965, 2,491,038 pairs of the 630,000,000 pairs produced were exported; their value was $7,829,566*. As part of a broad industry study funded by the Economic Development Administration, Battelle investigated the potential for increased shoe export sales in some markets. Other similar American products enjoying export success were to be surveyed. It was also to be determined whether untapped markets currently exist and whether a future potential appeared possible. Recommendations as to how these markets might be penetrated and developed further were to be outlined. If no markets were evident, reasons were to be cited.

Approximately 47 American shoe-industry people were interviewed and 31 foreign sources were visited by the Battelle research team. The analysis was undertaken in terms of the broad classifications of: product characteristics, production technology, management philosophies, markets available, marketing methods, problems encountered, and existing opportunities. Import and export data supplied by the Business and Defense Services Administration through the foreign desks of the International Commerce Department were analyzed. Hypotheses were developed and a literature review was made. Conclusions were then drawn and recommendations made as follows.

Current export markets are available, but they exist as "pocket markets" that open and close according to a number of variable factors and forces. These markets are stratified and exist primarily for highly specialized products. American shoes face extreme competition in style, weight, and quality in the major well-developed markets.

Sizable markets are developing in some countries that appear to be following socioeconomic developments comparable to those that have occurred in the United States. However, restrictions and local regulations currently prevent these markets from being exploited by most individual American manufacturers. Tariffs on shoes appear to be one of the earliest trade barriers raised by developing countries.

It was not possible to quantify the size of specific markets. Because of the many and varied factors, descriptions, and types of shoes, one can do this only for specific shoes at a specific time. A feasibility study will be required according to specific manufacturers lines to determine more exact potentials at any given time.

*Figures reported by Business and Defense Services Administration at time of reporting. Other data in text were preliminary at time of project completion.

It was concluded that in general the American shoe industry has exploited foreign markets to the extent that they were available without excessive restrictions. The shoe industry, like other American industries, is faced now with the decision as to whether it wants to enter the "era of international marketing" now that the "stage of exportation" is on the wane. To become an international marketer requires the development of distribution capability, merchandising training and education, and long-range investment capital. Very few shoe companies are able to venture these independently. Therefore, a survey is recommended to ascertain the interests of American shoe manufacturers and to subsequently develop a foreign-trade mission. It is further recommended that, depending on trade-mission results, a mutual selling cooperative be formed to represent a full line of shoes, leather, and component parts representative of its membership. Also needed is the establishment of programs to penetrate key major markets through the use of proven American merchandising techniques and to develop the image of quality American footwear.

A potential was also noted for the possibility of "piggy backing" other consumer products complementary to shoes, since this appears to be a parallel to trends currently taking place in the United States. There is sufficient evidence to forecast that consumption trends in other countries will be similar to those experienced in the United States.

To less developed markets, the cooperative would export shoes, leather, and components parts, growing with the industries within those countries. As markets develop and tariffs become restrictive, it could take the next step and develop marketing capabilities within those countries. As the success of the initial mutual American shoe cooperative grows and becomes recognized, it could proceed to expand through development of sister cooperatives.

INTRODUCTION

The American shoe industry, being a semibasic industry, dates to the beginning of the United States. From the day of the cobbler, the industry has progressed by increasing output per worker and making other technological advances in production. The marketing of shoes has become closely related to that of other soft goods where fashion, merchandising, advertising, brand preference, quality, distribution, and price are essential to success.

This progress, however, has not been free of serious problems. One problem has been that of international marketing; shoe exports from the United States have been decreasing steadily and shoe imports have been increasing at an accelerating rate. As a consequence, President Kennedy's Administration was asked to give protection to United States shoe manufacturers either through direct tariffs or through preferential treatment such as orderly marketing quotas. These requests came at a time when that Administration was attempting to encourage a freer foreign exchange of all goods. President Kennedy, being familiar with the New England shoe industry, suggested a deeper look into the industry in general to see what other areas might need assistance to insure long-range industry progress rather than merely short-range corrective measures.

To some observers, international trade is a problem of balancing. They contended that excessive imports can best be offset by forcing an increase in exports. Other observers felt that the shoe industry was sufficiently different from other types of industry that standard criteria could not be used in judgment. This study by Battelle resulted from the combined interests and concern in this regard on the part of the United States Department of Commerce, various industry associations, and leading shoe companies.

The goal of this portion of the project was initially to study United States exports and to attempt to find reasons for success in those countries that are importing American shoes. Hopefully, these reasons for success might lead to the development of American shoe import markets in other countries.

An attempt also was to be made to find similar products that had experienced export successes and to ascertain whether it was possible to use these export methods to help develop American shoe exports.

Finally, the study was designed to determine how potential export markets might be penetrated, what market characteristics dominate, and what essentials are required for successful exporting. Conversely, if markets did not prove to be available, then the study was to describe the barriers encountered, the reasons for the conditions that existed, and the difficulty of circumventing them by American manufacturers.

METHOD AND SCOPE

The overall research job was divided into the following tasks: (1) defining the problem, (2) analyzing the problem and potential solutions, and (3) reporting conclusions and making recommendations.

The Department of Commerce team secured dossiers of data from 22 countries, using an approved questionnaire outline to retrieve data from various foreign commerce desks. Each dossier was made as close to standard and as complete as possible, with the data subtotaled by shoe types and by categories where feasible. Discrepancies did develop because of revised standards and nomenclature. Most of these were resolved. The dossiers were then sent to Battelle for analysis and compilation.

Concurrently, Battelle began a literature review and developed, tested, and reproduced an interview guide (see Appendix C). This guide was used in contacts with some 47 United States shoe industry representatives, mostly in person.

In the analysis of the dossiers from the 22 countries, consideration was given to shoe types, sizes, prices, styles, sources, exports, imports, market factors (such as direct tariffs, indirect quotas, distribution, and competition), and socioeconomic factors (such as standards of living). This analysis was intended to indicate where promising or unpromising shoe markets potentially existed. An attempt was made to organize these data into more meaningful categories, but this proved to be impossible for the most part because of the number of variables and the lack of comparability of the data. For example, shoe tariffs were reported in nonuniform currency, kilos and pounds, pairs and other quantities, and by types and materials.

A second problem in developing quantitative data regarding shoe-export potential is the tremendous number of types of shoes (style, price, etc). This makes useless any attempt to define a total quantified "export-market potential" for the entire United States shoe industry. Rather, quantitative market potential for each shoe type must be individually assessed by the particular company or companies considering export of those particular shoes. Thus quantitative export market potential could not be and was not developed in this research program, but it is recommended that such information be developed for the particular shoes to be exported by an individual company.

After the data had been analyzed and potential markets identified, Sweden, Belgium, and France were visited by members of the Battelle research team; 31 foreign contacts were made. The results of these firsthand observations were then added to the analysis, hypotheses were tested, conclusions were drawn, and recommendations were made. A model of the export phase of the study appears as Figure 1.

INDUSTRY BACKGROUND AND HYPOTHESES

Production

In 1965, approximately 800 American manufacturers produced 630 million pairs of leather or leather-type shoes. The 5 largest companies produced 24.6 percent of this total; the 20 largest companies produced 40.2 percent; and the 50 largest companies produced 54.0 percent. Among the top 80 firms in dollar sales, 14 are general-line men's, women's, and children's shoe manufacturers; 30 manufacture women's shoes only; 9 make men's shoes only; 3 make women's and men's shoes; and 6 manufacture children's shoes only.* The shoe industry, unlike many other American industries, is not dominated by a small number of large companies.

Of the total manufacturers, approximately 250 to 300 sell brand-name shoes. These producers are concerned with company image, quality of product, and all the ramifications of fashion, style, distribution, and marketing. The remaining 500 to 600 "volume manufacturers" sell to one or more mass distributors. These manufacturers' main concerns are production, costs, and delivery.

Some 22 companies are publicly held; the balance are heavily weighted by family ownership and small operations. One-third of the industry reports no profit annually. Table 1 summarizes entries and exits from the industry in recent years.

Summarizing the production function in the American shoe industry and its relationship to export opportunities, several hypotheses can be made:

(1) Technological advances in shoe production have not been universal or industry-wide.

(2) Technological advances have depended upon capital available, financial condition of individual companies, ability of management, desire of management, and ownership of individual companies.

*Rossi, William A., "Top Eighty Shoe Manufacturers in 1964", Boot and Shoe Recorder, April 15, 1965, p 51.

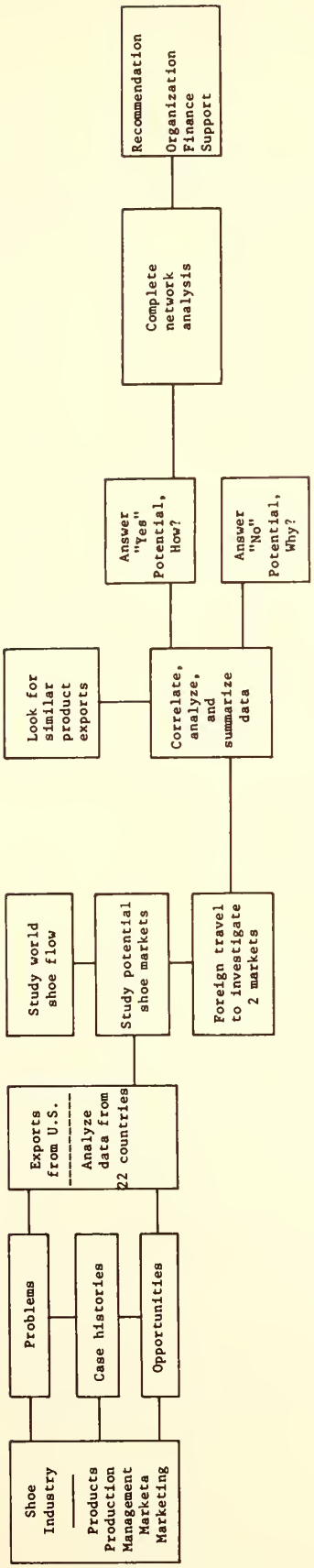

FIGURE 1. MODEL OF EXPORT PORTION OF STUDY

(3) Much of the stimulus for innovation has come from outside the industry rather than through individual shoe-company research-development-engineering initiative.

TABLE 1. SHOE MANUFACTURING EXITS AND ENTRIES, UNITED STATES, 1951-1963[a]

Year	Number of Entries	Number of Exits	Net (Entries Less Exits)	Number of Shoe Manufacturers
1963	42	51	- 9	726
1962	35	52	-17	735
1961	46	36	+10	752
1960	48	39	+ 9	742
1959	27	49	-22	733
1958	22	41	-19	755
1957	17	39	-22	774
1956	43	46	- 3	796
1955	44	49	- 5	820
1954	50	60	-10	840
1953	38	82	-44	858
1952	55	82	-27	885
1951	55	80	-25	913
	522	706	-184	

Source: Records, National Footwear Manufacturers Association.

(a) This table shows changes for an industry segment representing about 95 percent of total footwear (except rubber) production.

Distribution

The merchandising function in the shoe industry has been one of the bright spots compared to that of many other industries. In the past, many manufacturing industries have been so production-oriented that marketing was left to the "better mousetrap" theory. Shoe manufacture was one of the early industries to become "marketing oriented". Because of the high percentage of labor and high inventory costs, manufacturers sought to shorten the production-to-consumer distribution channels as much as possible. Some companies integrated into their own distribution. Large retail companies became powerful quantity shoe purchasers. The revolution in soft-goods retailing led to other developments. The result has been the evolution of a distribution system that, with the advent of electronic data-processing procedures, has and will become even more effective. Table 2 shows the distribution channels.

Generally, it can be stated that manufacturers of brand-name shoes have done a very good job of promoting their products, taking advantage of mass-media advertising, and using new merchandising techniques. This kind of effort requires years to build the personnel, the facilities, and the organization required for success.

TABLE 2. ESTIMATED DISTRIBUTION OF SHOE SALES BY TYPE OF STORE

Type of Store	1948 Shoe Sales, millions of dollars	1948 Percent of Market	1958 Shoe Sales, millions of dollars	1958 Percent of Market	1963 Shoe Sales, millions of dollars	1963 Percent of Market
Shoe Stores (Total	1,467	47.5	2,130	52.9	2,489	52.4
"Chains" - 11 or more units	583	18.9	890	22.1	1,054	22.2
"Independents" - 1-10 units	885	28.6	1,240	30.8	1,435	30.2
Department Stores	425	13.8	650	16.1	818	17.5
Leased departments	72	2.4	136	3.4	230	4.8
Owned departments	353	11.4	514	12.7	588	12.7
General Merchandise, Dry Goods, etc.	289	9.4	311	7.7	330	6.9
Leased departments	8	0.3	20	0.5	40	0.8
Owned departments	281	9.1	291	7.2	290	6.1
Variety Stores	10	0.3	42	1.0	50	1.1
Leased departments	2	--	4	0.1	10	0.2
Owned departments	8	0.3	38	0.9	40	0.8
Men's and Boys' Wear Stores	122	3.9	144	3.6	155	3.3
Leased departments	11	0.3	24	0.6	35	0.7
Owned departments	111	3.6	120	3.0	120	2.5
Women's Apparel, Accessory Stores	114	3.7	201	5.0	230	4.8
Leased departments	53	1.7	90	2.2	110	2.3
Owned departments	61	2.0	111	2.8	120	2.5
Family Clothing Stores	61	2.0	94	2.3	115	2.4
Leased departments	20	0.7	34	0.8	45	0.9
Owned departments	41	1.3	60	1.5	70	1.5
All Other	592	19.2	455	11.3	500	11.6
Summary						
Shoe stores (all)	1,467	47.5	2,130	52.9	2,489	52.4
Leased departments	169	5.5	308	7.6	470	9.9
Owned departments, other channels	1,453	47.0	1,592	39.5	1,728	37.7
Total Consumer Expenditures	3,089	100.0	4,030	100.0	4,688	100.0

Source: Records, National Footwear Manufacturers Association.

Summarizing the distribution function of the American shoe industry, the following hypotheses can be made relative to shoe exporting:

(1) Interest in foreign markets could vary as widely as the types of companies (classed according to their products) in the industry.

(2) The problems of size and fit could be compounded in foreign markets just as foreign shoe fit could be problematical in the United States market.

(3) American marketing and distribution capabilities might well be used overseas as they have with other American merchandising successes such as Sears and Woolworth.

(4) Fashion as a point of importance in shoe purchases may have a different value overseas from what it does in the United States.

(5) In an industry where fashion is an essential part of new-product development, where much of selling success rests on individual reputation, and where people are highly creative; operations, methods, and reasoning may well be different from those in less "dramatic" industries.

(6) Socioeconomic developments in other countries could well provide guidelines as to shoe needs, market potentials, and distribution channels available.

(7) A "fear of returns" in a marketing organization due to quality control problems could hamper interest in exports because of the need to deal at greater distances and with less than customary distribution control.

Capital

The capital function or structure of the shoe industry, while not unique, is not typical either. The shoe industry is a low-return, low-capital, high-labor-input industry. History shows that entry and departure has been easy in this industry because of equipment leasing, supplier financing, etc., as shown in Table 1. "Inners" and "outers" in any industry cause problems for the more stable producers. However, as an industry goes through stages of growth, it reaches a point of maturity, and short-run, high-input, high-return successes become more difficult to attain. Success then favors those companies with foresighted management that plans and invests for long-range return.

Summarizing the capital function of the American shoe industry with special reference to the exports, the following hypotheses can be developed:

(1) The industry appears to be accustomed to short-range planning; therefore, licensing arrangements may be favored rather than the development of marketing capabilities overseas. There may be short-range market exploitation.

(2) Because of the nature of the industry, there may be little interest in venturing into unknown areas; as a result, an unqualified negative decision on the part of management may be made.

(3) Because of the generally short capital supply, there may be limited funds available to invest overseas.

(4) If the history of the industry shows accounts receivable to be a problem, this could dim the view towards foreign sales with its currency-conversion and collection problems.

(5) Because of the American industry's stage of growth, most efforts and funds (depending upon the company) could well be directed toward "staying in business in the United States, rather than venturing into foreign markets".

(6) Interest in exports and/or foreign marketing may or may not be a personal decision, depending upon the individual, the size of the company, etc.

REQUIREMENTS TO SUCCEED IN THE FOREIGN MARKETING

The following is a list of some of the general requirements for any United States company to succeed in the foreign marketing of most types of American-made products:

(1) There must be a basic desire on the part of management to participate in foreign marketing.

(2) There must be a willingness on the part of company management to invest the money, time, and talent.

(3) A company must have the ability to invest money, time, and talent.

(4) A company should obtain an introductory knowledge of the broad benefits to be gained, as well as the broad problems likely to be encountered.

(5) A company must be able to define the activities to be engaged in by their own personnel, as well as those that will need to be delegated to others.

(6) The company must establish an export desk, an export department, or an assignment and job description for company personnel.

(7) If an export agent is to be used, the necessary survey and selection activities and criteria should be outlined, as well as a plan of action. If a company man is to be used, a man usually must be hired and/or trained in international marketing procedures.

(8) A survey should be made to find the location of the best potential markets.

(9) A definite plan of action should be developed covering 3 years, 2 years, and 1 year, with at least the first 6 months' budget and activities spelled out on a monthly basis.

Special Requirements for International Marketing of Shoes

The above list pertains to the marketing of almost any type of product. The following list was developed as a guide to the special requirements for the international marketing of American-made shoes:

(1) There must be a knowledge of consumer fashion trends and related socioeconomic developments both in the United States and in potential overseas markets.

(2) There should be a general knowledge of shoe manufacturing practices, both in the United States and in specific overseas markets.

(3) There should be a knowledge of shoe-marketing and consumption trends in specific foreign regions, countries, or even cities, depending upon the size of the foreign market.

(4) A company should have a detailed knowledge of the foreign-trade requirements of each of the countries in which trade is to take place.

(5) There should be a detailed knowledge of the distribution channels in each of the prospective countries.

(6) There should be a knowledge of the specific product benefits offered by American-manufactured lines, as well as a knowledge of the products available in a specific foreign market.

(7) An exporting company or an export agent should possess a line that is sufficiently broad that it permits him to appeal to different specific markets and also permits the selling cost to be spread over a number of products.

(8) There must be an excellent relationship between the customer (foreign importer or retailer) and the American exporter, in order to insure the reliability of certain activities, facilitate communications, and encourage maximum cooperation.

(9) The American exporter should be able to deliver merchandise within a comparatively short time after the products have been sold from a given group of samples.

(10) American manufacturers or exporters should be able to sell a "package" and sell the benefits of American-made shoes. (Herein lies the difference between a professional shoe salesman and a peddler taking orders.)

(11) The American company should be able to finance well-rated foreign "open" accounts.

(12) The company should be prepared to accept payment in foreign currency and the risk encountered therein.

(13) The American exporter should be able to deliver merchandise of excellent quality, exactly as ordered and represented, in undamaged, unpilfered containers.

(14) American exporters must be able to follow through with post-sales service and the training of sales personnel.

(15) Finally, such exporters should be in a position to provide promotion materials in desired quantities, in the necessary languages, and of the types that best motivate particular foreign buyers to purchase American-made shoes.

In summary, there should be the same ability to sell, deliver, satisfy, and resell in foreign lands in the same excellent manner that most shoe companies have achieved in this country.

ANALYSIS AND CONCLUSIONS

Analysis

In order to develop a logical approach to the situation in question, an analysis network system was used. Working downward through the network shown on Figure 2, the research team continued to ask the question "Why?". This approach helped provide a logical order of magnitude to the reasons for the existence of a given situation, in this case, declining United States shoe exports.

This same analysis-network approach was used effectively to investigate the validity of alternative recommendations. The research team then worked back up through the network asking the question "How?". Much of the detail of this analysis is described later in this report. Conclusions are noted below, leading to the recommendations that follow in the next section.

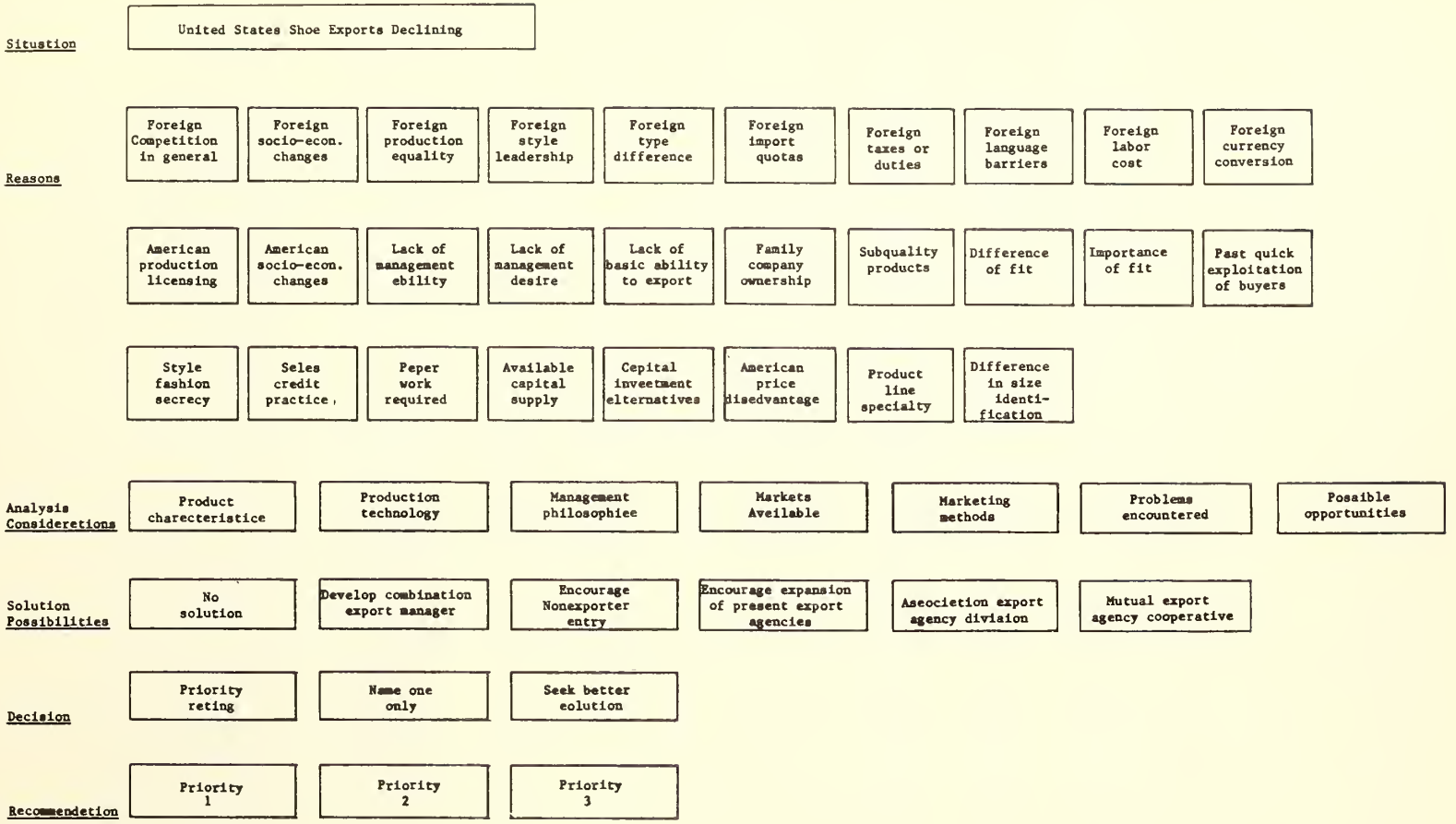

FIGURE 2. NETWORK FOR ANALYSIS OF THE U.S. SHOE-EXPORT SITUATION

Source: Battelle.

Conclusions

General

There are current export markets available for United States shoes, but they exist as "pocket markets" that open and close according to a number of variable factors and forces. These markets are stratified and exist primarily for highly specialized products. American shoes face extreme competition in style, weight, and quality in the major, well-developed markets. They also face extreme price competition in some markets.

There are opportunities for the sale of inexpensive, typically non-American-type shoes in the lesser developed countries (which should interest United States shoe manufacturers as a new-product opportunity), as well as opportunity to sell typically American-type products in these and other markets. The size of individual markets must be determined through feasibility studies directed toward specific goals according to specific product lines of specific manufacturers.

American shoes generally enjoy an excellent reputation.

Sizable markets (to many companies) are developing in some countries that appear to be following socioeconomic developments comparable to those that have occurred in the United States. However, restrictions and local regulations prevent these markets from being currently exploited by American manufacturers.

The word "sizable" has different connotations to different manufacturers. Some interpret a whole country in terms of one United States city and judge its potential accordingly; others do not.

Raising shoe tariffs appears to be one of the earliest trade barriers set up by countries as they develop. Most countries, when they raise barriers make across-the-board restrictions because local industry demands shoe protection. Table 3 shows the types of direct problems encountered.

Indirect problems are more difficult to define. These include quota changes and political delays in clearances.

However, some markets can be satisfied only by imported shoes. To educate local governments to relieve pressure on certain classes of shoe imports requires time, talent, and money that cannot be profitably invested by one manufacturer alone, which reduces the interest of the exporter, export agent, and foreign importer of shoes.

Success in foreign shoe-marketing efforts requires the same close working relationship as that encouraged in the United States. However, this relationship must also include more patience, an excellent agent, and a capable traveling factory man knowledgeable in shoe marketing (not necessarily shoe production). It also requires a broad line of products ofttimes not available from a single company.

Properly planned, organized, and controlled exporting activity can be a valuable contribution to diversified income. It can add opportunistic production volume, and it can offer low credit risk.

TABLE 3. DUTIES AND REGULATIONS ON SHOE IMPORTS IN SELECTED COUNTRIES

Source: U. S. Department of Commerce, Washington, D. C.

Country	Duties and Regulations
Bahamas	10% preferential duty 20% general duty No license required
Belgium	14-20% duty 6% turnover tax
Bermuda	7½% preferential duty 10% general duty
Bolivia	20% specific duty 20% ad valorem CIF 5% sales tax 2% turnover tax 6% consular fee
Brazil	120% ad valorem-duty CIF 50% advance deposit - classed special 5% surtax 10% consumption tax 10% exchange surtax
Canada	25-27% duty CIF 11% sales tax
Columbia	200% duty CIF 120% deposit
Denmark	No license required 12.5% turnover tax 5.4-25% duty
Japan	20-30% ad valorem-CIF Foreign Exchange regulated
Netherlands Antilles	No license required 6% value
Nassau	--
Norway	10-20 Crowns/Kilo 13.7% turnover U.S. 50% more than EFTA Label/tech compliance No license required
Mexico	Strict import licensing controls 10-100% ad valorem duty 0.20-40.0 Pesos specific duty 3% surtax on imports other than by mail 10% surtax on mail imports
Panama	$4.80/dz pair children $30/dz pair mens $18-24/dz pair womens
South Africa	30% duty Preferred country License-restricted shoe types
Sweden	14% duty 10% turnover tax 4.2% applying to EFTA No license required

TABLE 3. (Continued)

Country	Duties and Regulations
France	No license required 25% sales tax 16.5% duty
Germany	14.4% duty 6.0% turnover tax No license required
Hong Kong	No duties No taxes No restrictions
Italy	16-18% ad valorem duty 4% sales tax on duty paid value 5% import tax
Jamaica	15-25% general duty 4-6% sales tax 10-20% surtax
Switzerland	150-350 SF/100 Kilos WT 5.4% sales tax EFTA favored No license required
United Kingdom	22½-30% duty 10% surcharge CIF 10% purchase tax on wholesale

Most licensing ventures have not been in effect long enough for their success to be critically analyzed. Licensing in a comparatively nontechnical industry seemingly has a 3- to 5-year cycle before one or another of the companies involved loses its patience, before funds expire to the point where renegotiation is necessary, or before separation due to desperation takes place. The current success of some companies is well-founded, but that of others can be attributed to having a "currently hot product at the right time".

Management

Leading American shoe manufacturers generally have been aware of export potentials and international marketing requirements. They have taken advantage of export markets when and where they existed as long as they existed without excessive restrictions. The larger, more aggressive companies have remained in foreign trade partly through licensing. This has given them better ultimate control on imports into this country than otherwise.

The development of foreign production technology and subsequent product equality (combined with lower labor costs) has adversely affected the interest and activity of many United States shoe exporters. The competitive struggle and the particular stage of growth of the American shoe industry have caused American shoe-company management to carefully weigh the most profitable use of capital. Export activities have not been among those with the highest payoff. The demand on executive time in well-managed companies and the lack of detailed export knowledge in less well-managed companies have caused exports to receive less than top-priority interest or attention. However, there is an expressed interest on the part of several of the more aggressively managed, medium-size companies to explore export potentials.

Marketing

Referring back to Figure 1, which shows the model of this project, it can be seen that part of the analysis was to include investigation of other products experiencing successful export activities. Contrary to Battelle's original hypothesis, very few products with an appreciable export business could be correlated to the factors found to be pertinent in the shoe industry. Shoes seem to involve more unique differences between United States and foreign models than other products; the international shoe trade is not like international trade in clothes, china, cameras, bicycles, automobiles, perfume, jewelry, watches, or toys. The differences of stated size, style, wrench size, metric system, etc., are readily overcome with conversion tables when sold in different countries. However, the difference in actual fitting shoe size, materials used, and shapes of feet are critical to the success of foreign-made shoes selling here as well as American-made shoes selling abroad. Thus, other United States industries' export activities cannot serve as perfect models for the shoe industry.

Trends toward more leisure time in the United States, a more affluent society, increased consumption of specialty shoes, and the more casual appearance in shoes have encouraged imports of the less precisely fitting shoe (especially at lower cost) into the United States and their acceptance by the buying public.

Conversely, American shoe manufacturers must first educate the foreign public that American shoes do fit better. Foreign buyers must have achieved a standard of living where this difference of superiority can be recognized and valued to such a degree that it results in the purchase of American shoes. Thus, for American shoes to be sold overseas competitively on a broad scale with mass marketing methods similar to those used in the United States, the exporter must first find comparable foreign markets and then educate those markets.

American shoe-marketing know-how is an exportable commodity, but it requires money, time, and talent, which are not readily available, and it does not offer short-range payoff opportunities. Educating children in the more advanced countries in Europe (such as Sweden, Belgium, and Germany) to the better fit and brand-name identification of American shoes, will require an estimated marketing investment of more than 5 years. It can be postulated that continuation of European growth will require more marketing ability similar to that of American firms. The growth of the European shoe industry indicates that it is looking to the United States for guidance in marketing and merchandising.

It is quite possible for American companies to move into the marketing function of shoes on foreign soil much as other industries have entered the distribution function in other lands. It could be theorized further that the companies or combination of companies engaged in this distribution function might not have previous experience in shoe distribution in the United States.

The American shoe industry is experienced in micromarketing and in its use in the very stratified shoe markets. It seems highly possible that this experience and development of proven methods in the United States could be applied to shoe distribution in well-developed foreign countries. Initially, this distribution may require a combination of local production and only a small amount of United States shoe importation. However, as the United States gains further advantage in its second stage of industry growth, it could well become an important source of shoe imports for foreign countries because of price, quality, or other advantages.

The labor-differential factor is a major one; however, it is expected to become less and less significant as European labor costs rise, and its role in the more developed foreign economies is gaining new meaning. Increased unionization activities, broad socialistic employee benefits, and other developments appear to be approaching those experienced by the American shoe manufacturer. If actual marketing costs were to be deducted from the wholesale price of branded American products and only partially reflected in foreign-market-promotion allowances, or if incremental cost-accounting methods were to be used, the delivered-price differential to key foreign markets could be made more competitive.

Again, if an American-owned marketing company became a part of a given country's shoe industry, it could bring to bear internal political pressure that would favor future importation of American shoes into that country more effectively than could an outsider.

It was concluded that in general Department of Commerce data and services are very good, highly reliable, and readily available; but that they can be used only as a very general guide. The countries suggested by industry field interviews as the best potential markets showed little correlation with the countries that the statistical data

indicated to be most promising. In general, public information and volumes of statistics can be relied upon only to obtain an indication of where markets may exist. The actual availability of markets at any given time can be determined only through visitation by highly capable personnel able to translate these availabilities into specific selling opportunities for specific shoe types.

It was not possible to adequately summarize the enormous amount of raw data from the various countries and to establish a numerical priority of potential markets. There was a vast array of data, much of which could be considered pertinent to future shoe-marketing activities. (It might well be desirable to bring this information together in one publication as a guide to subsequent information-retrieval and research-project structuring.)

Attempts to improve future American shoe exports on a broad, continuing scale will require the combined efforts of interested shoe-industry leaders and the United States Department of Commerce. They will need to (1) work with a long-range plan and investment capital to build overseas marketing capability in well-developed countries; (2) build a sales organization(s) that can sell certain types of shoes to underdeveloped countries; (3) sell other types of shoes to other countries; and (4) sell components and materials to other countries that have their own developing shoe industries.

Figure 3 (point D) denotes the intersection of American shoe exports to any developing market and the trend line of that foreign country's production capability. Beyond point D, as the quality of product required for that market become more competitive and as protective tariffs are established, the continued success of an exporter depends on his decision to enter the "international marketing stage" in that country or region. If the exporter cannot, or chooses not to, his volume will decline in that market. He must then find other markets in this early stage of development to maintain his export volume. Those companies that define a given market(s) as essential must prepare themselves to become international marketers. Other American companies have faced these same decisions that shoe manufacturers are facing now.

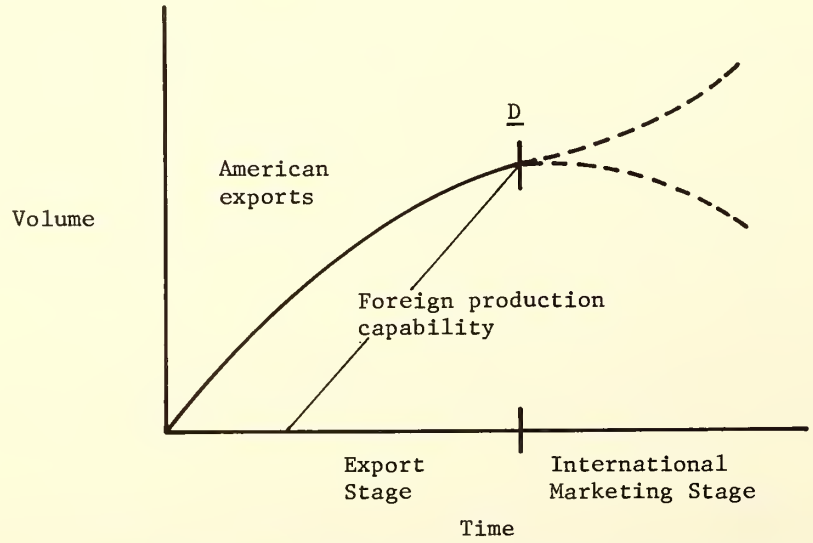

FIGURE 3. STAGES OF EXPORT SUCCESS IN A GIVEN FOREIGN MARKET OVER A PERIOD OF TIME

Source: Battelle.

The following recommendations are intended to assist both the Sponsor and interested shoe manufacturers.

RECOMMENDATIONS

These recommendations were developed by reversing the flow of logical thought through the "analysis network" in Figure 2. Repeatedly asking the question "How?" provided a means whereby several alternatives were considered and resulted in the following recommendations, segmented into "phases". Thus, Phase I must be answered affirmatively and positive action taken before Phase II becomes possible. As Phase II becomes more feasible and as logical steps are pursued which result in accumulated successes, then Phase III becomes important to future planning, organizing, and controlling of activities.

Phase I

(1) Make a survey to ascertain the actual, genuine interest in exports on the part of shoe-industry management. Choose ten to twenty companies from the survey on the basis of their past performance, size, products manufactured, product quality, age of management, reputation, and financial condition, in order to include a broad array of factors. Past export experience would not be essential; in fact, it could be detrimental. Company size would not be critical. Medium-size companies with flexible, decisive professional management would be preferable. The objective is to choose those men most likely to make the program work and in need of such a program in order to export.

(2) Plan and execute a foreign-trade mission made up of personnel from approximately ten of the above companies to visit key European countries to study what marketing and distribution situations exist from their individual viewpoints and to survey the problems and opportunities likely to be encountered.

Phase II

(1) Establish a mutual shoe marketing cooperative if the trade mission provides positive indications. This would satisfy the greatest number of requirements for success most economically and effectively. Include in the cooperative's membership only those American manufacturers who are interested in a long-range investment and screen the membership according to strict criteria. Membership should represent a broad line of products and would require (in all probability) a capitalized initial investment, a finished-goods financing of 45 days, and an agreement to offer a selling price to the cooperative based on an "incremental cost plus".

(2) It would be necessary to establish a 3-year budget and to follow the requirements for successful export operations that were noted earlier in the text. After initial capitalization by members, it would be necessary to obtain financing, preferably through a New York bank with excellent foreign-trade capabilities. It also would be essential that some provision be made for "seed" money and to protect or guarantee the membership's initial investment through a prearranged secondary government financial guarantee.

(3) It would be desirable to establish a New York office with a staff made up of a general manager, a traveling salesman experienced in sales training and foreign travel, and an expediter to expedite orders in the United States and clear necessary papers, etc. It is suggested that the general manager have a background in soft-goods merchandising and training and experience in one of the large international merchandising organizations. In other words, he preferably would not have a shoe-industry orientation unless it happened to be gained through the above type of experience.

(4) The cooperative would then proceed to participate in foreign trade shows and to survey specific foreign-market potentials. This would be followed by the establishment of a foreign-marketing capability that would penetrate one market at a time through acquisition or through joint foreign capital investment.

In some markets, wholesale operations would be most profitable, both initially and ultimately. In other markets, wholesaling may later lead to retailing. In still other markets, conditions may be proper for starting with retail stores to sell only American shoes and related items. Each market would require individual study at a particular time to determine the best plan of action. Initially, it may also be necessary to contract for local production, depending upon the country; but this should be easily negotiable, especially where there is an excess of productive capacity.

One of the major advantages of this type of program would be the development of a brand name that, when promoted and used as a slogan, would assist in building recognition of "quality-fitting American footwear". Very few American-brand shoes are known and preferred in foreign markets, especially in non-English-speaking countries. Therefore, to build a common cooperative brand name would be an advantage.

Should other well-known private American-brand labels gain recognition, they also could be used along with the mutual American shoe-cooperative slogan if their producers were members. This program would build a basis for exclusive import rights when it becomes necessary to exert pressure on the local foreign government for "preferential treatment of products not locally available within that country". It also would be helpful if the close "informal" relationship with the United States Department of Commerce could assist in gaining preferential treatment in foreign lands. Where marketing efforts are not possible, it would be advantageous to export shoes, leather, and component parts to other markets where a local industry is being developed.

Phase III

After beachheads of successful marketing activities have been established in Europe and the mutual American shoe cooperative and American members are enjoying a good return on their investment and repaying the "seed" money loan, several alternative opportunities could develop. Using the successful pattern of the first mutual American shoe cooperative, there might well be sufficient interest on the part of other American manufacturers to form a second mutual American shoe cooperative.

If European markets did not provide sufficient available potential, possibly the second cooperative could seek Latin American markets. Later, a third cooperative might be formed to sell in Asia, Africa, India, or other markets as they develop throughout the world. It should not be overlooked that the above cooperative-type movement also could assist in the research and development of "non-American"-type shoes that could be produced and sold to underdeveloped countries. While these shoes would be new products unfamiliar to United States manufacturers in some ways, they should be looked upon positively, as a promising area for possible new business related to present experience.

Results to be Expected

American shoe manufacturers would stand to gain in a number of ways by following the above recommendations. Some of the ways are listed below.

(1) American shoes would gain an increasing acceptance in the world, and their quality, fit, and service would come to be recognized. Examples of such recognition in this country are French perfumes, English china, and Scotch woolens.

(2) American marketing ability to establish beachheads could develop throughout other major world markets. The pattern of success could be so clear-cut that it could be matched by only a few large foreign cartels or large American companies.

(3) American shoe exports would increase both in the short-run and over the long-run. This would enable productive capacity in the United States to be improved and expanded in areas needing Economic Development Administration assistance.

(4) American shoe manufacturers would profit because they would be paid promptly, they would be paid in United States dollars from the cooperative, and they would receive patronage refunds from the surplus left over from operating costs and foreign-currency exchanges. It would offer them an opportunity to increase plant efficiency in areas needing economic development assistance by Government, it would enable them to increase their production runs per order, and it would provide them with off-season or intercycle production.

They would have no inventory problem because they would be producing and shipping to order. Exports could provide extra

volume to help carry factory burden and overhead, thereby possibly permitting manufacturers to reduce their overall annual overhead burden factor. This in turn would enable them to compete more effectively with imports into the United States.

(5) There also is a potential beyond merely retailing American shoes in foreign countries. This could extend into the merchandising of other American-made items, possibly including non-shoe-manufacturer members. It could develop into piggybacking other items for other manufacturers, who would only sell to the cooperative and leave all of the marketing responsibilities to the cooperative. The cooperative then would take on full responsibility and become known for these additional services, thereby opening up wider opportunities to other American manufacturers.

The cooperative would become known for its ability to build the reputation of American-made consumer products and for its ability to overcome import restrictions through aggressive use of American mass-marketing techniques in stratified markets with specialty products.

Other Considerations

In all probability, the question could arise, "Why not develop an association export agency, as has been done previously with other products?" Or there may be industry members who will question the need for all of the "new developments and suggestions". A condensed list of reasons follows.

The structure of the shoe industry, individual company interests, and individual company abilities require that aggressive commercial action and leadership be obtained in order to get positive results. A sales cooperative cannot be "association-minded" and work for the good of all manufacturers. A cooperative must be quite selfish in its interests to produce the most profits possible for its interested and aggressive members. Therefore, it is necessary to minimize all political implications that might otherwise be required.

A shoe sales cooperative would not be like any other industry association agency because the structure and experience of the shoe industry are unlike those of other successful association export agencies. Shoes involve style and fit problems; therefore, it is not just an appearance, operation, or quality connotation that must be sold, as with most other manufacturers' associations.

The integrity of the individual companies must be the highest, and the quality of products in relation to price must be the very best. This will require close screening of supplier members because there is no room, when "pioneer marketing", for trial and error in the quality of products.

Also, some shoe companies, in their own opinions, have already done or are doing a successful job of exporting. Therefore, the problem is recognized and interpreted in a different way by them than it is with other product association agencies formed to meet foreign competition that are without previous export experience.

It is essential also that the financial soundness of the cooperative be beyond question. Many associations have a financial problem, although this may not be true in the shoe industry.

It is essential that there be no previous friendships to be considered and no previous experience, especially negative experience, to restrict positive activities. It will be necessary that the cooperative develop a reputation for merchandising and service, not just shoe exporting.

It is hoped that, by requiring an investment on the part of interested companies, only financially able companies will be able to invest and thereby receive financial reports on a private basis. This would not be possible under an association open to all.

The goal of this cooperative initially would be to assist small and medium-size interested manufacturers, thus allowing a larger number of companies to combine efforts with a minimum of conflict of product lines. This is not to say that the cooperative could not later be broadened to include large companies that may at the time be either exporting or not exporting. The benefits of such a cooperative might be such that it would be recognized by large as well as small companies and independent exporters, all of whom might become more compatible as history showed proven records of success.

The last, but one of the foremost, reasons for the above recommendations is that the goal of a mutual selling cooperative is to make a profit for its members. Therefore, it must initially seek the best potential markets, and these decisions must rest with the management of the cooperative. Such decisions cannot be made by a committee of the members on a broad scale in a fragmented industry.

A joint export managership, representing several companies, is judged not to have good chances for success. The capital and financing requirements are too high and there would be too much emphasis on individuals. Also, a reputation must be developed in a broader connotation than would be achievable by a couple of companies with a combination export representative. A mutual sales cooperative must be stronger than the largest individual member in order to rise above the personal pressures inherent in the mission to be accomplished.

Summary of Recommendations

The recommendations may be summarized as follows:

(1) Ascertain the interests of American shoe manufacturers and develop a foreign trade mission.

(2) Form a mutual selling cooperative to represent a full line of shoes, leather, and component parts typical of its membership. Study and then penetrate key major markets through the use of proven American merchandising techniques. Develop the image of quality American footwear.

(3) Export shoes, leather, and component parts and grow with the industries within those countries that have less developed markets. As markets develop and as tariffs become restrictive, take the next step and develop marketing capabilities within those countries.

(4) As the success of the initial mutual American shoe cooperative grows and becomes recognized, proceed to expand through development of sister cooperatives.

CURRENT STATUS OF THE SHOE INDUSTRY

Production Technology

Production of nonrubber footwear in the United States totaled 630,000,000 pairs in 1965. This is a gain of 2.9 percent over 1964 and a gain of 20.5 percent since 1950. The United States produces approximately 23 percent of the world's output of footwear, although its population is less than 6 percent of the world total. Estimated production of nonrubber footwear is shown by country and year in Tables 4 through 9.

Output per worker in the United States is generally quoted as approximately 1-1/2 pairs of shoes per hour. This level of production appears to be generally attainable where there are large-quantity production runs available, such as in companies producing for their own retail outlets or producing private-brand label merchandise. Conversely, output per foreign worker under the most advanced conditions appears to be only about 1/2 pair of shoes per hour.

Earnings per hour per worker are often cited and used in comparing United States with foreign production (see Table 10). However, the major foreign competitors are faced with rapidly rising production costs and labor problems. Germany and Sweden, for example, have highly-unionized industries and are paying fringe benefits to the point where they can no longer compete with French, Italian, or Spanish labor. Most of Europe has had increasing labor costs; as a consequence, industries located in such countries are looking to the labor markets in countries that have not yet experienced these wage increases.

It was observed that when lower productivity per worker, higher labor turnover, longer working hours, and higher fringe benefits (which in some cases are forced on them by their socialistic governments) are added together, the resultant labor differential compared to the United States is becoming smaller.

Operations favoring economy of scale seem to be increasing in the United States, although much production is still on a short-run basis when considering a particular model shoe. Western Europe is very similar to the United States in that its industry is fragmented and thus faced with the problem of many small orders from many small buyers. Eastern Europe, with its government-controlled production seems to enjoy longer production runs and some economies, although there are disadvantages too.

TABLE 4. ESTIMATED WORLD PRODUCTION OF NONRUBBER FOOTWEAR

In Thousands of Pairs

Country	1930	1940	1949	1955	1957	1959	1961(a)	1963
North America	333,839	444,383	540,623	669,814	688,401	733,342	703,002	701,360
South America	40,414	51,892	88,797	109,774	137,435	134,410	137,565	153,805
Europe	457,011	455,131	471,209	546,723	492,257	514,584	649,935	868,420
U.S.S.R.	(b)	(b)	(b)	(b)	179,660	277,300	310,715	401,600
Asia and Oceania	51,652	63,088	101,924	130,984	144,426	155,021	182,015	353,904
Africa	13,260	18,136	25,228	38,310	41,425	40,805	43,700	54,110
World	896,176	1,032,630	1,227,781	1,495,605	1,683,604	1,855,462	2,026,932	2,533,199

Source: Leather, Shoes and Allied Products Division, Department of Commerce.

(a) Plastic shoes included for first time.

(b) Prior to 1957, included with Europe.

TABLE 5. ESTIMATED NORTH AMERICAN PRODUCTION OF NONRUBBER FOOTWEAR

In Thousands of Pairs

Country	1930	1940	1949	1955	1957	1959	1961(a)	1963
Canada	17,646	26,261	36,256	38,700	43,850	45,922	46,512	46,978
Costa Rica	290	353	1,100	610	620	600	660	640
Cuba	4,150	4,464	6,950	7,815	7,500	7,000	6,200	6,000
Dominican Republic	400	411	610	600	610	595	630	650
Guatemala	212	265	690	1,700	1,870	1,500	1,610	2,100
Haiti	210	266	409	600	610	612	615	600
Honduras	70	85	95	370	365	350	360	330
Mexico	5,060	6,248	15,980	30,000	35,000	40,000	42,440	48,000
Nicaragua	408	523	695	750	735	716	720	750
Panama	205	249	310	300	400	412	415	440
El Salvador	220	240	490	600	650	635	640	660
United States(b)	304,170	404,151	474,258	585,369	597,611	632,500	599,500	591,409
Other	798	867	2,780	2,400	2,580	2,500	2,700	2,800
Total	333,839	444,383	540,623	669,814	692,401	738,206	696,409	701,357

Source: Leather, Shoes and Allied Products Division, Department of Commerce.

(a) Plastic shoes included for first time.

(b) Official nonrubber figures not adjusted for overstatement in 1960 to 1963 for small quantities of rubber-canvas output.

TABLE 6. ESTIMATED SOUTH AMERICAN PRODUCTION OF NONRUBBER FOOTWEAR

In Thousands of Pairs

Country	1930	1940	1949	1955	1957	1959	1961[a]	1963
Argentina	14,960	19,500	31,889	18,900	39,600	36,500	37,215	45,600
Bolivia	210	212	317	370	350	310	315	330
Brazil	15,819	20,988	37,912	67,500	69,200	69,800	71,110	69,500
Chile	3,200	3,992	5,890	6,200	7,100	7,200	7,315	9,800
Colombia	890	1,226	2,468	3,600	4,015	4,100	4,403	3,110
Ecuador	985	1,117	1,386	1,400	1,610	1,500	1,707	1,615
Peru	996	1,218	3,297	4,000	4,320	4,400	4,500	9,100
Uruguay	980	1,066	1,100	2,200	2,615	2,500	2,600	3,000
Venezuela	2,000	2,089	2,585	3,500	5,785	5,600	5,800	9,000
Other	374	484	1,953	2,104	2,840	2,500	2,600	2,750
Total	40,414	51,892	88,797	109,774	137,435	134,410	137,565	153,805

Source: Leather, Shoes and Allied Products Division, Department of Commerce.
(a) Plastic shoes included for first time.

TABLE 7. ESTIMATED EUROPEAN PRODUCTION OF NONRUBBER FOOTWEAR

In Thousands of Pairs

Country	1930	1940	1949	1955	1957	1959	1961[a]	1963
Austria	6,000	3,818	3,695	8,600	9,250	9,470	10,020	12,000
Belgium	15,100	9,200	7,817	9,200	9,310	9,850	11,250	27,172
Bulgaria	1,900	1,712	1,670	(b)	(b)	(b)	(b)	(b)
Czechoslovakia	23,120	21,050	19,886	15,860	15,500	15,290	18,515	20,000
Denmark	4,810	4,300	5,625	6,312	6,800	6,000	7,100	7,900
Eire (Ireland)	3,968	5,035	5,772	5,100	5,750	5,500	5,800	7,000
Finland	1,980	1,994	3,489	3,200	3,760	3,600	3,500	7,000
France	45,312	31,224	44,815	52,000	56,200	60,100	96,600	172,032
Germany	80,000	65,009	42,595	75,000	79,620	88,915	134,500	156,059
Greece	4,200	5,311	6,166	6,000	6,730	9,270	9,150	14,400
Hungary	4,612	4,800	4,314	4,000	3,983	4,200	12,500	13,800
Italy	29,617	24,711	23,888	40,000	44,814	51,612	59,710	90,000
Netherlands	13,216	12,773	15,268	16,645	18,200	21,000	22,315	28,870
Norway	3,995	3,927	3,687	4,200	5,200	4,400	4,920	4,800
Poland	15,857	14,100	12,860	6,250	6,500	7,100	8,665	9,000
Portugal	1,500	2,115	1,916	3,000	4,220	4,500	4,300	9,200
Rumania	3,900	4,000	3,590	2,600	2,500	2,700	2,500	4,000
Spain	7,995	6,500	10,785	19,500	24,500	25,010	26,540	46,750
Sweden	8,112	8,836	8,910	11,350	13,250	13,905	21,600	10,280
Switzerland	7,885	7,015	9,880	9,000	11,610	12,050	14,330	15,010
U.S.S.R. (Prewar boundaries)	48,920	80,203	90,875	94,000	179,660	277,300	310,715	401,600
United Kingdom	118,917	130,202	135,600	144,300	152,000	146,800	161,120	185,400
Yugoslavia	3,895	4,772	4,860	6,600	7,150	8,312	9,500	21,747
Other	2,200	2,524	3,246	4,006	5,410	5,000	5,500	6,000
Total	457,011	455,131	471,209	546,723	671,917	791,884	960,650	1,270,020

Source: Leather, Shoes and Allied Products Division, Department of Commerce.
(a) Plastic shoes included for first time.
(b) Included in "Other".

TABLE 8. ESTIMATED NONRUBBER FOOTWEAR PRODUCTION IN ASIA AND OCEANIA

In Thousands of Pairs

Country	1930	1940	1949	1955	1957	1959	1961[a]	1963
Malaya	960	1,965	2,412	1,500	3,124	3,000	3,200	3,700
British Oceania	188	383	600	(b)	(b)	(b)	(b)	(b)
China	5,120	1,582	5,430	2,500	5,110	5,465	6,000	7,200
India	5,149[c]	6,725[c]	39,980[c]	44,510[c]	40,145	41,010	43,710	105,000
Indonesia	1,100	2,461	2,012	2,400	2,600	2,514	2,800	3,600
Israel	395	797	2,615	3,400	4,800	5,011	7,155	5,900
Japan[d]	9,085	9,337	5,460	16,500	7,500	17,200	29,900	62,000
Pakistan	(c)	(c)	(c)	(c)	6,715	6,500	7,750	35,000
Philippines	1,450	1,986	2,683	5,000	6,210	5,900	6,800	6,500
Syria	2,200	3,266	2,790	2,800	2,615	2,920	3,900	5,100
Thailand	195	205	219	314	320	300	500	6,010
Turkey	4,780	4,918	6,358	15,000	18,115	17,060	19,500	20,000
Australia	16,800	23,495	21,860	27,000	34,000	34,612	35,500	36,882
New Zealand	2,370	3,413	5,095	6,000	9,212	9,415	10,300	7,012
Other	1,860	2,555	4,410	4,060	3,960	4,114	5,000	50,000
Total	51,652	63,088	101,924	130,984	144,426	155,021	182,015	353,904

Source: Leather, Shoes and Allied Products Division, Department of Commerce.
(a) Plastic shoes included for first time.
(b) Included in "Other".
(c) Prior to 1957, production figures for Pakistan were included with those for India.
(d) Prior to 1957, these figures included nonleather shoes.

TABLE 9 ESTIMATED AFRICAN PRODUCTION OF NONRUBBER FOOTWEAR

In Thousands of Pairs

Country	1930	1940	1949	1955	1957	1959	1961[a]	1963
Egypt	4,400	5,727	7,250	13,500	13,610	14,065	14,900	14,000
Union of South Africa	6,900	9,426	11,780	16,400	18,105	17,840	18,600	26,010
Other	1,960	2,983	6,198	8,410	9,710	8,900	10,200	14,100
Total	13,260	18,136	25,228	38,310	41,425	40,805	43,700	54,100

Source: Leather, Shoes and Allied Products Division, Department of Commerce.
(a) Plastic shoes included for first time.

TABLE 10. AVERAGE HOURLY EARNINGS, HOURS WORKED PER WEEK, AND WEEKLY EARNINGS OF NONRUBBER-SHOE-PRODUCTION WORKERS

Year	January	February	March	April	May	June	July	August	September	October	November	December	Annual Average
						Average Hourly Earnings for Production Workers (Nonrubber), dollars							
1963	1.69	1.68	1.70	1.70	1.70	1.71	1.69	1.71	1.74	1.74	1.74	1.73	1.71
1962	1.66	1.67	1.68	1.68	1.68	1.68	1.67	1.68	1.69	1.68	1.69	1.68	1.68
1961	1.61	1.61	1.63	1.62	1.62	1.62	1.61	1.63	1.65	1.66	1.66	1.66	1.63
1960	1.58	1.59	1.59	1.60	1.60	1.60	1.59	1.59	1.59	1.60	1.60	1.58	1.59
1959	1.54	1.55	1.55	1.55	1.55	1.55	1.54	1.55	1.55	1.55	1.56	1.56	1.55
						Average Hours Worked per Week by Production (Nonrubber) Workers							
1963	37.6	37.1	36.4	34.9	36.0	37.6	38.1	38.1	36.8	36.9	36.5	38.8	37.1
1962	38.8	37.9	37.6	36.5	36.7	38.1	38.6	37.9	36.5	35.3	35.9	37.3	37.3
1961	37.8	37.1	36.4	35.1	36.4	37.7	38.3	37.2	35.9	35.5	37.3	38.5	36.9
1960	38.0	37.2	36.8	34.9	35.8	37.7	38.7	38.1	35.1	34.5	35.4	35.6	36.5
1959	39.3	38.8	37.9	36.7	37.4	38.4	38.4	37.8	36.4	35.9	36.7	37.4	37.6
						Average Weekly Earnings of Production (Nonrubber) Workers, dollars							
1963	63.54	62.33	61.88	59.33	61.20	64.30	64.39	65.15	64.03	64.21	63.51	67.12	63.44
1962	64.41	63.29	63.17	61.32	61.66	64.01	64.46	63.67	61.69	59.30	60.67	62.66	62.66
1961	60.86	59.73	59.33	56.86	58.97	61.07	61.66	60.64	59.24	58.93	61.92	63.91	60.15
1960	60.04	59.15	58.51	55.84	57.28	60.32	61.53	60.58	55.81	55.20	56.64	56.25	58.04
1959	60.52	60.14	58.75	56.89	57.97	59.52	59.14	58.59	56.42	55.65	57.25	58.34	58.28

Source: Bureau of Labor Statistics, U. S. Department of Labor.

The quality of foreign-made shoes (especially of Italian, French, English, Spanish, and Japanese origin) was found to be quite comparable to that of shoes produced in the United States. It was also noted that this was not necessarily a deterrent to successful selling of United States shoes in foreign markets. However, it can cause problems where extremely wide price differentials exist. Furthermore, travelers throughout Latin America have observed that shoes produced by companies in Argentina, Brazil, Chile, and Peru all seem to be of sufficiently good quality for the societies in which they were sold.

Product Characteristics

Fit of American shoes is universally acclaimed and accepted not only in the United States but in key markets throughout the world. This is further substantiated by a recent consumer study*, which showed that over 80 percent of all shoe purchases were satisfactory. European shoes are sold in fewer widths. In other parts of the world, different types of shoes may be used, and width and size become less important with the lower level of socioeconomic development. In the United States, there is a strong trend toward more casual shoes. This trend is beginning also in Europe and in the more developed countries. Sandals are popular in the United States, as they are in other countries. There seems to be a definite recognition of European ability to produce style and supply shoes that appear to be heavy, although they are comparatively light in weight.

Fashion and shoe designing looks to Europe for leadership. Italian and French-styled shoes seem to be gaining acceptance not only in the United States, but also in other markets. The trend in the United States is towards increasing per capita consumption and the use of special-occasion shoes, e.g., shoes for gardening, boating, golfing, etc., as shown in Table 11. This same trend, while not as far advanced in other countries with high standards of living, also appears to be developing in a manner similar to the early stages of the United States shoe-consumption trend.

TABLE 11. U. S. NONRUBBER FOOTWEAR PRODUCTION, EXPORTS, IMPORTS AND CONSUMPTION: 1960-1964

In Thousands of Pairs

Year	Production	Exports	Exports, percent of production	Imports[a]	Apparent Consumption[b]	Imports, percent of consumption	Imports, percent of production
1965	630,070	2,491	0.40	87,632	715,211	12.25	13.91
1964	612,789	2,836	0.46	75,372	685,325	11.00	12.30
1963	604,328	2,843	0.47	62,820	664,305	9.46	10.40
1962	633,238	2,867	0.45	55,057	685,428	8.03	8.69
1961	592,907	3,007	0.51	36,668	626,568	5.85	6.18
1960	600,041	3,244	0.54	26,639	623,436	4.27	4.44

Sources: Production: Current Industrial Reports, Bureau of the Census; Exports: FT-410 Reports, Bureau of the Census; Imports: FT-110 and I.M.-146 Reports, Bureau of the Census.

(a) Footwear with supported vinyl uppers not included prior to June 1962.

(b) Production plus imports, minus exports equals apparent consumption.

*Elmo Roper and Associates, Study of Shoe Industry, August 1965.

Opinions on the acceptability of American shoes in other parts of the world varied, depending upon the success or knowledge of the interviewee. Some reported that there was very little demand for American shoes overseas. Others stated that there was a decided demand for American shoes but that there were insurmountable problems in getting them imported into a country. There were others (obviously those who were the most successful in exporting) who stated that there was an almost universal demand for American shoes.

It should be observed, however, that the style of all American shoes not only is distinctive, but that each style is also distinctive between men's, women's, and children's shoes. In European countries, at least at present, this latter difference is not so apparent.

It was pointed out that while fashion trends generally are predictable, shoe model decisions and consumer acceptance are extremely difficult to anticipate. However, there are foreign companies that are doing market research to assist them in anticipating consumer acceptance of advanced-model shoes.

Materials used in shoes are changing both in the United States and in Europe. Synthetic materials seem to be experiencing excellent success in the United States, although there seems to be some resistance in Europe. The quality of the materials used in foreign shoes and in American-made shoes seems to be quite comparable. On the other hand, it is not uncommon to find foreign markets in some instances distinctive from those in the United States on a broad scale. For example, in Sweden, shoes must be able to withstand all types of weather and multiple use. In the United States, boots are used widely, as are specialized shoes. Therefore, the importance of waterproofing, rubber soles, or ability to withstand all kinds of extreme conditions is not considered necessary.

The outlook for shoe products appears to be continuing towards a lighter weight shoe, although it will not necessarily look lighter. A number of industry spokesmen referred to the advent of proper stretch materials from which shoe uppers could be made. Fashion experts point to more combinations of colors and materials in shoes, which will complement other clothing. Of course there are those far-out thinkers who see man reverting back to the days of barefootedness, except that his feet would be sprayed with a chemical plastic for protection. They don't, however, venture suggestions for style, color, etc.

Management Philosophies

It was observed that the managements of the most aggressive companies are widely traveled, both in the United States and throughout the world. The larger companies also have staff members who travel overseas to study fashion trends and production techniques, to contract production, to manage quality control, and to expedite orders. Many United States company managers know personally and work closely with small companies in foreign lands. They also are aware of the strong competition that the large cartels provide in Europe and Japan.

These men report that they see little technical-production advantage, and little or no labor advantage, to their own operations. Styling is comparable in Europe, and copying is a way of life. In the fashion-secrecy type of business, lead time is critical

and always too short. Therefore, many of these men conclude that Europe, for example, will copy our industry advantages much the same as the United States industry has copied European advantages.

One of the advantages currently enjoyed by United States manufacturers is the demand for hand-sewn shoes. There is a shortage of skilled labor in the foreign lands for this type, and the exporting of these products is, therefore, enjoying very good volume, even to such advanced countries as Switzerland, France, Italy, and Australia.

There is also a group of company managers who are in the category of "We tried it and failed" or "We did export but the markets dried up". This latter group usually refers to the Caribbean market. There is another group of company managers who point to the export results as not being easily seen and understood and whose commonly expressed comment is "We'll get around to it".

On the one hand, it is apparent that there is little elasticity in management thinking; on the other, one can cite the example of one company president who is well trained in exporting but who was forced to eliminate his export department because of alternative needs for time, talent, and capital. Still, this same company is a major importer. Figure 4 illustrates this foreign-marketing interest on the part of American manufacturers. Another company that did extremely well in the export business in previous years (in excess of $1,000,000 in sales) has had to reduce its export division with several offices to one small department in the home office because of pressures to consolidate and its inability to maintain a profitable export volume. Figure 5 illustrates some of the export decisions required by shoe-industry management.

The attitude of shoe-industry company managers ranges widely, but it is interesting to note that the newer, younger, better-educated, more aggressive management coming into the industry seems to be more interested in exports. One such man stated, "Imports are good for any industry; they make Americans work harder". The opposite viewpoint was, "Oh no, we would not support any type of export program because we would have to expand our production facilities". This latter view reflects a wish not to rock the boat because retirement is on the horizon for key personnel. Figure 6 illustrates this subject graphically.

There appears to be an overcapacity in most countries, and depending upon the level of socioeconomic development, present technology appears to be generally acceptable for the countries in question.* It is interesting to note that the same condition is reported in the United States. However, all American manufacturers interviewed reported that they were running at maximum capacity, and in some cases this was given as a reason for not being interested in "the additional production necessary to supply export markets". See Tables 12 and 13.

Equipment development and innovation seem to be coming largely from Europe, primarily because the European industry has been rebuilt on a more modern basis since World War II, whereas the United States industry, which was not affected in this way by the war, has remained with established trends in labor, profit, and plant location. It was also noted that foreign manufacturers take an extremely aggressive approach to new equipment purchases, often purchasing intentional overcapacity and then building

*United States Department of Commerce raw data from foreign desks, Bureau of International Commerce.

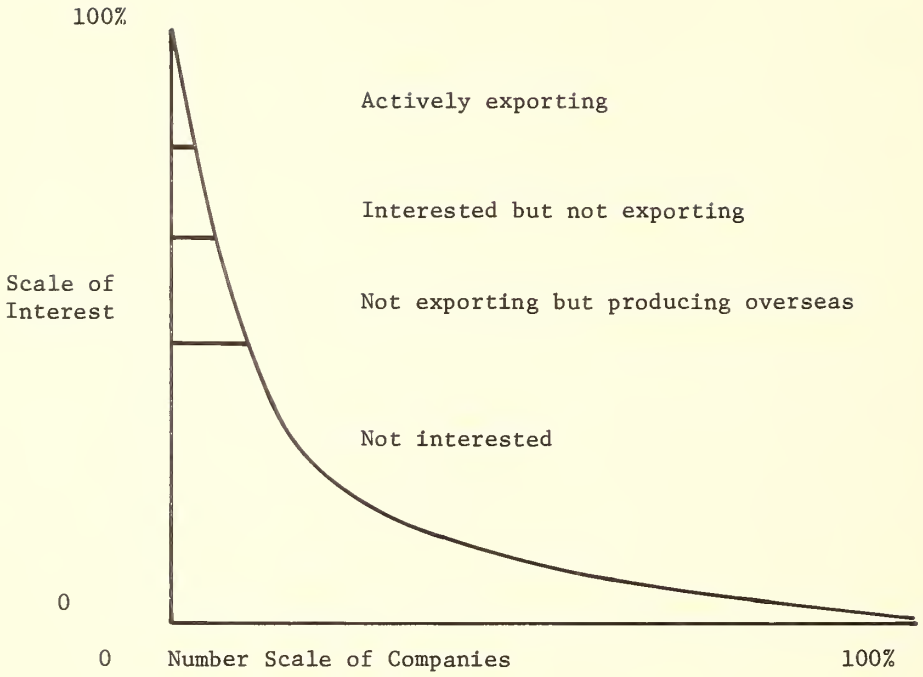

FIGURE 4. FOREIGN MARKETING INTEREST OF AMERICAN SHOE MANUFACTURERS

Source: Field interviews and literature review.

Note: It is difficult to quantify exact numbers of companies because some companies are both exporting and producing overseas. Some companies are interested in exporting but are not exporting. However, the great bulk of the industry is not interested for various and sundry reasons. 100 percent in this scale equals those 250 to 300 major companies based on a sample of 47 companies. (It does not include all companies in the industry).

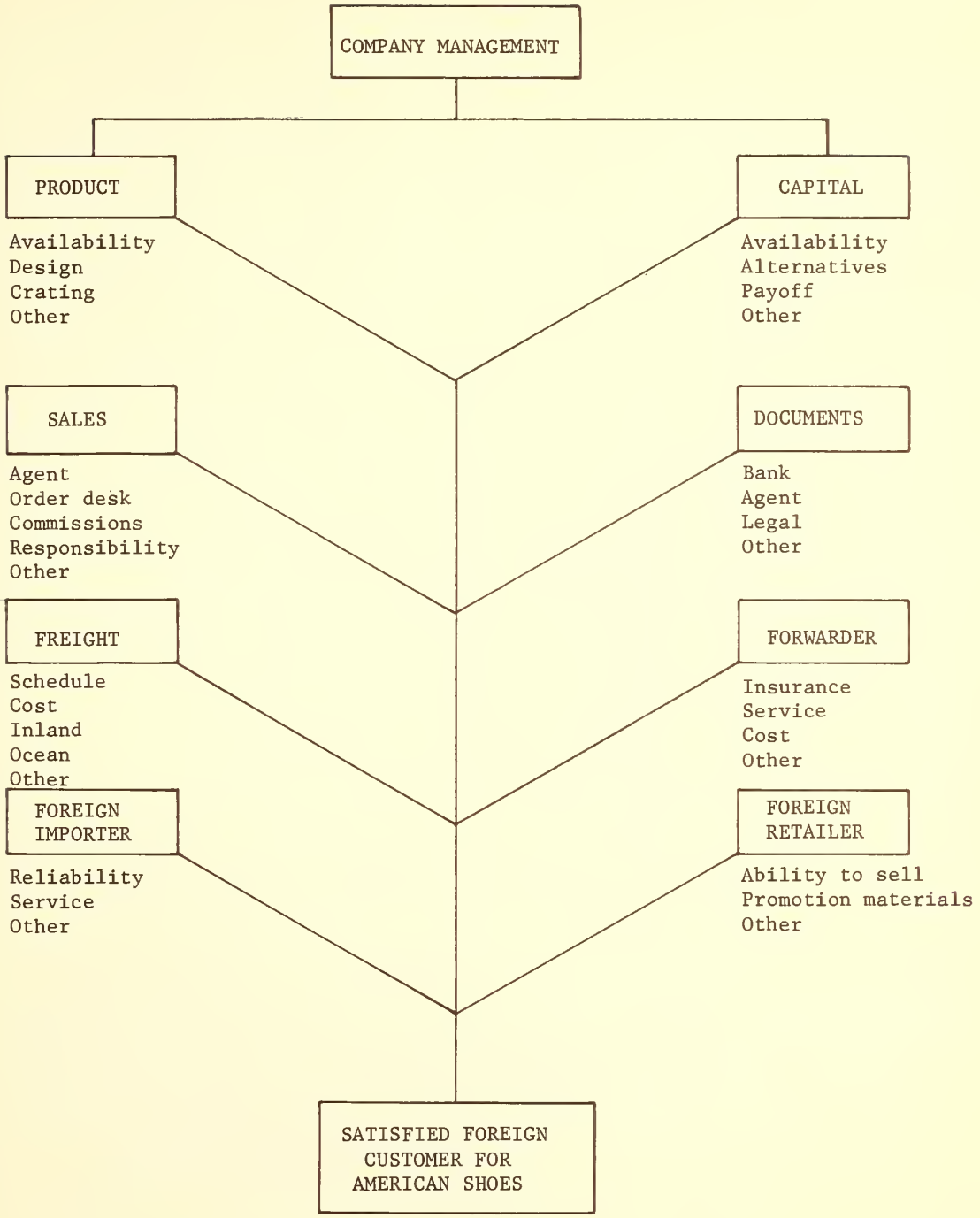

FIGURE 5. MANAGEMENT DECISION-MAKING CONSIDERATIONS IN SHOE EXPORTING

Source: Battelle analysis based on field interviews.

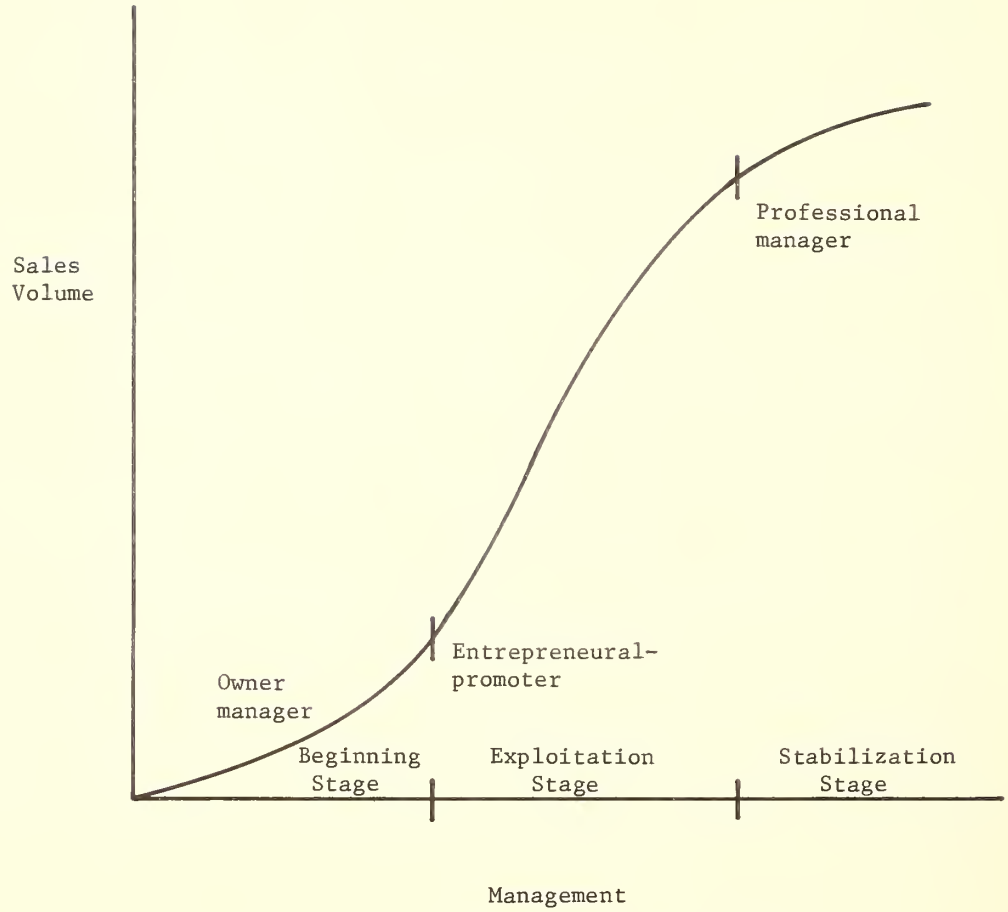

FIGURE 6. STAGES OF CORPORATION GROWTH AND TYPES OF MANAGEMENT REQUIRED

Source: Davis, R. C. --Principles of Business Management, 1951 Harper and Row, New York, New York, p 139.

sales volume accordingly. Increased use of injection molding and vulcanizing processes are the most significant recent technological developments both in the United States and overseas. About 15 percent of the United States production in 1964 was accounted for by these processes.*

It can be stated that, in general, shoe-industry management is aware of potential overseas markets, but the industry is so fragmented that cooperation and support of a unified export program similar to that achieved with other commodities (watches, for example), would be difficult to generate. The industry is high-risk in fashion design, etc., but very conservative elsewhere in the operational decisions. Thus, an idea has to be good and have comparatively low risk or an extremely high payoff in order to receive the necessary recognition on which to base a decision.

TABLE 12. UTILIZATION OF NONRUBBER-SHOE-PRODUCTION CAPACITY, 1953-1963

Thousands of Pairs

Year	Total Effective Capacity(a)	Actual Production(b)	Percent of Utilization of Capacity
1963	781,080	591,409	75.7
1962	789,336	597,636	75.7
1961	778,824	592,907	76.1
1960	780,538	600,041	76.9
1959	755,676	637,364	84.3
1958	758,736	587,115	77.4
1957	763,776	597,648	78.2
1956	760,296	591,757	77.8
1955	742,644	585,369	78.8
1954	699,588	530,367	75.8
1953	678,816	532,031	78.4

Source: NFMA.

(a) Total effective capacity is the sum of the monthly production peaks for each type of footwear over a 36-month period ending December 31, of the third year involved.

(b) Official nonrubber figures not adjusted for overstatement in 1960-1963 for small quantities of rubber-canvas output.

*U. S. Industrial Outlook, United States Department of Commerce, Business and Defense Services Administration, Washington, D. C., p 149.

TABLE 13. PERCENTAGE UTILIZATION OF SHOE-PRODUCTION CAPACITY BY TYPES OF FOOTWEAR (NONRUBBER), 1953-1963

In Percent

Type of Footwear	1963	1962	1961	1960	1959	1958	1957	1956	1955	1954	1953
Men's, other than work	89.2	90.6	86.3	82.4	88.1	84.7	86.1	87.3	86.0	82.3	87.7
Men's, work	81.8	89.4	83.6	75.2	88.6	78.1	83.3	88.1	83.1	75.7	55.1
Youths' and boys'	66.1	71.1	85.1	81.6	88.5	81.2	83.1	84.7	86.0	83.1	77.5
Women's, regular	84.0	77.1	77.9	80.2	90.4	81.6	81.1	82.6	81.3	79.9	85.7
Women's, sandals and playshoes	72.7	68.3	70.9	71.6	80.6	74.4	76.8	73.5	74.8	66.6	70.6
Misses'	77.3	71.1	75.1	77.0	83.4	75.7	80.4	77.1	83.0	80.9	84.6
Children's	78.0	78.2	80.5	80.1	83.9	71.2	74.7	73.6	78.9	74.9	77.1
Infants' and babies'	60.7	75.4	81.0	82.3	85.4	78.8	79.3	78.3	79.8	77.4	79.5
Athletic	65.3	77.0	72.1	79.1	86.9	75.0	84.3	82.8	98.2	85.0	81.3
Slippers	62.1	69.3	63.4	66.5	71.2	67.4	67.7	64.7	69.3	65.3	71.4
Other	53.9	67.5	78.5	81.2	82.2	80.7	37.2	45.5	35.8	68.8	57.1
Total	75.7	75.7	76.1	76.9	84.3	77.4	78.2	77.8	78.8	75.8	78.4

Source: NFMA

Note: Total effective capacity is the sum of the monthly production peaks for each type of footwear over a 36-month period ending December 31 of the year involved.

Markets Available

The United States shoe market is very stratified. If placed into a matrix the shoe market can be segmented horizontally by product type, method of manufacture, etc., and segmented vertically by price classifications. Often the shoe industry is characterized as a "mass marketing effort". However, this mass identification refers more to the large geographic size (multicity, multistate) of markets and types of promotion used. Foreign countries cannot be identified in the same context. Europe could be a similar mass market if all countries had the same currency, language, and standard of living. Then the only differences in demand would be similar to those experienced in the United States, where narrower, more modern styled shoes sell better on the East Coast and wider, more conservative models sell better inland. Instead, each European country is like a separate city or state in the United States. Thus, the size of a given market in Europe may be considered quite small in terms of the customary marketing costs incurred and the results obtained per market experience in the United States.

A more extreme situation is evident in Latin America, where in Brazil, for example, the population is large, but only a small segment can afford the luxury of shoes in the same sense as Americans use shoes.

Another extreme is that in Africa, where shoes in many of the emerging countries are a sign of individual economic-standard attainment. These shoes are generally unlike those worn in the United States. Plastic shoes imported by the millions from Hong Kong are quite popular.*

A final extreme is seen in the Orient where because of age-old custom, physical makeup of legs and feet, and other differences, shoes are primarily foot coverings or sandals, not shoes as we know them in the United States.

The market is stratified in the United States more than it is in other countries because in the United States there is a very wide differential in retail prices and shoe styles. As per capita consumption of shoes increases, so does the importance of seasonality of purchase. This leads to vulnerability to weather at the retail level, which is already common in the United States and is becoming more common in Europe. The extreme winter of 1962 in Germany and the resulting excessive shoe-inventory problem is cited as an example.

Also, with increased per capita consumption, the importance and identification of shoe fit gains new meaning. In a low-income, labor-type economy, the wearing of work shoes predominates. The wearing of heavy socks has a tendency to permit "one-width fit". As a society gains more leisure time, the wearing of lighter stockings and dress shoes opens the way for better fit, and a new consumer demand develops. This has begun to occur in Europe. With the importance of fit, style, and price comes the importance of brand-name purchases and speciality shoes. Again, there is a stratification in foreign markets that is different from that in the United States, but it is growing steadily more similar to the United States market.

It is estimated that 70 percent of the total United States dollar volume in footwear is done by manufacturer and retail brand lines. Surveys show that the higher the educational level of the consumer, the more his buying leans toward branded products.**

*Roberts, I., "Shoes for Africa", Boot and Shoe Recorder, Chilton Publishing Company, Philadelphia, Pa., June 1, 1964, p 21.
**Rossi, W., "The Growing Influence of Brands", Boot and Shoe Recorder, July 1, 1965, p 23.

It is generally agreed that certain markets must be very quality-conscious in order to purchase American-made shoes where local price competition is extreme. Some observers also commented that United States shoes were overpriced. In other markets, French and Italian styling plus aggressive exporting activities seem to be winning an increasing share of the shoe market in the developing nations.

Some countries with great shoe-manufacturing potential have governments that either restrict imports (as in the case of Japan) or subsidize shoe exports (as in the case of Italian shoes coming into the United States). This puts the independent American shoe manufacturer at a disadvantage.

The United States seems to enjoy certain specialty markets, such as moccasins and loafers, or "hand-sewns" as they are commonly called. Casual rough or buffed-leather shoes with soft soles have and are enjoying tremendous demand, not only in the United States but overseas. Cowboy boots or western boots have followed the fads of American western-movie popularity in Europe. In these products, United States manufacturers have the advantage of skilled labor and craftsmanship available to them that is not as readily available to foreign manufacturers.

One of the outstanding examples of international shoe marketing successes is that of a large Canadian-based shoe corporation. This company becomes a local supplier in a particular country, thus becoming part of the economy of that country and producing the footwear in demand by that country's consumers. It is reported to have more than 80 independent operations held together by a very efficient, closely controlled parent corporation.

United States per capita spending on footwear in 1965 was $28.60 and 5.3 pairs. By 1975, these figures are expected to be $34.07 and 5.6 pairs, respectively. The average retail price is expected to increase from $7.00 per pair to $8.00 per pair.* This relationship might well be applied to countries where similar socioeconomic conditions are developing.

Marketing Methods

Marketing methods used in the United States are different from those experienced or necessary in foreign lands. For example, European manufacturers are accustomed to serving small regional markets, whereas American manufacturers are accustomed to selling large markets and wide geographic areas.

Methods of exporting American-made shoes are diagramed in Figure 7. The larger companies generally have an established international trading division, with a department devoted to exporting functions. Smaller companies generally have an export desk that works with an established export agent, or else the company has its own small staff where one person will usually travel and sell, while another expedites orders, thus handling much of the normal agent's functions themselves.

These companies concentrate on footwear sales only. However, there are other companies that are obtaining excellent results that export both shoes and other products. Thus, the cost of sales and the payoff are spread over a broader, more diversified product line.

*Boot and Shoe Recorder, September 1, 1965, p 39.

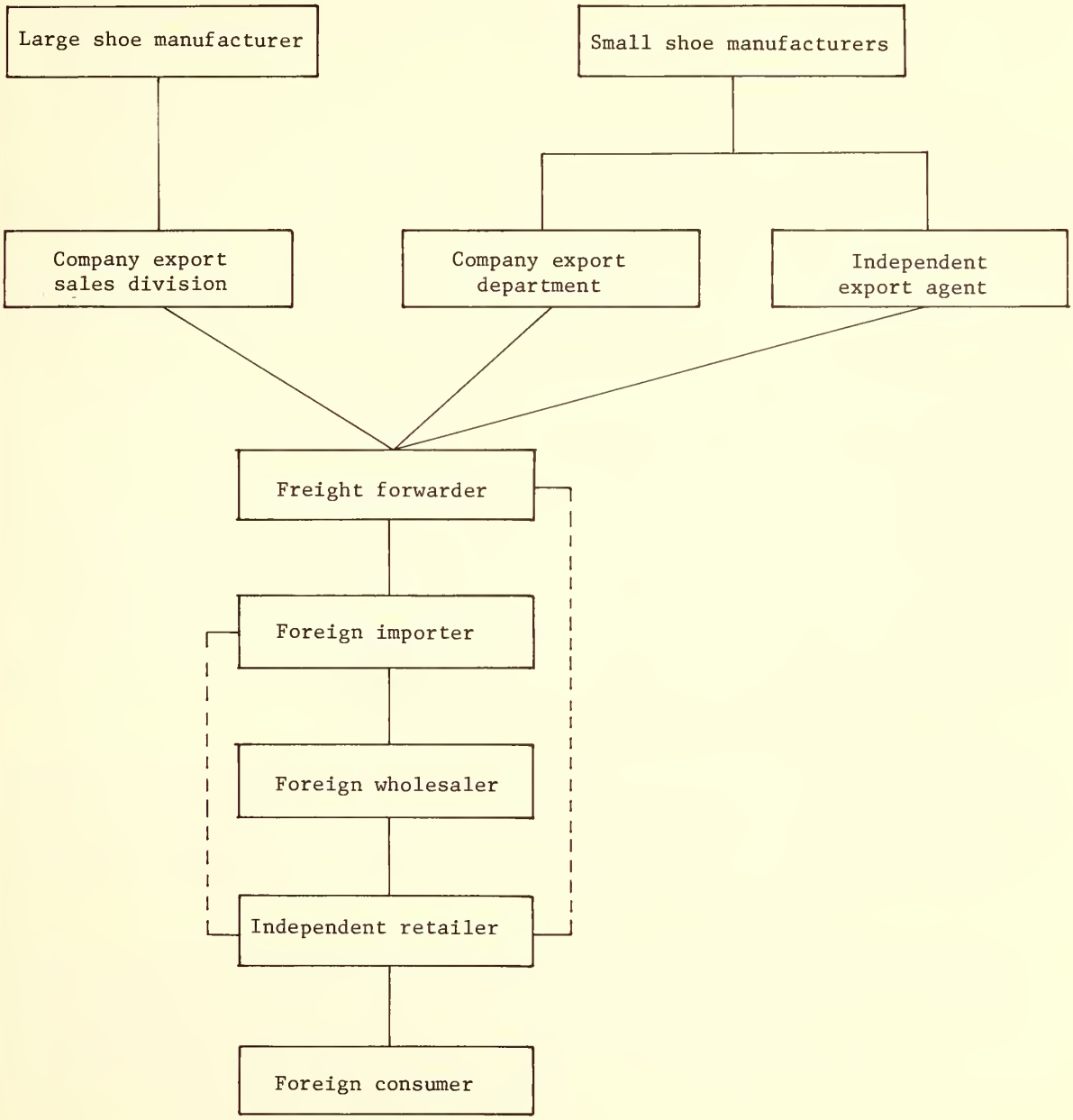

FIGURE 7. CHANNELS OF SHOE EXPORTS FROM THE UNITED STATES

Source: Battelle.

It should be noted also that distribution channels in foreign countries can vary, depending upon the size of the customer, the socioeconomic level of the country, and the amount of service desired or rendered by the importer. For example, a large portion of the retail outlets in England are owned by a few firms. In France, a large number of small, family-owned outlets prevail and are encouraged, while in Germany, centralized buying groups control much of the distribution.

Marketing methods used by American shoe manufacturers in the United States are well known to the industry and are not dealt with here except to observe that the importance of sales "follow-through" or "total marketing concept" are known and put into practice. It is reported that $44,869,000 was spent on advertising by the leather and leather-products industry in the year 1961-1962.*

Looking at the recent history of foreign-marketing methods for American shoes, it is seen that after World War II there was a need for shoes by many war-torn countries. There was also a small but growing need for shoes in some of the underdeveloped countries. As orders began to flow from these foreign countries to American manufacturers, the American shoe-export-agency business began to flourish, and, since there were few barriers to a free flow of goods, American shoe exports reached a high level.

During the same period, there also was an interest on the part of business executives in traveling outside the United States, initially to the Caribbean and later, beginning about 1950, to Europe. Traveling executives made friends, discussed business, and stimulated a foreign demand for United States shoes. Good profits were enjoyed because American shoe manufacturers were able to sell their products at the United States wholesale price FOB their plants. It was good business since marketing costs were low, and credit was no problem because the countries needed the American-made products and complied with American terms of sale.

As barriers began to develop and trading difficulties increased, the industry found that it was entering a buyer's market, and thus the order-taking salesman soon gave way, as did the receipt of large orders. Since the industry basically was accustomed to dealing direct and handling large orders, and was not accustomed to "bartering", many companies simply stopped exporting. Others developed licensing arrangements to permit the use of brand names and distribution in foreign countries.

It should be noted that the shoe industry has favored licensing of foreign production because it requires a lower input of capital, time, and talent. It should also be noted that the shoe industry uses the word "license" to also mean contract production in foreign lands for import into the United States. (Such term usage and comparable short-range outlook is indirectly good for the American industry because it provides for shorter term and less binding contracts where quality control, personnel problems, and style or production changes may require renegotiation of relationship.)

Other companies chose the third alternative – to continue their export departments as a diversification move – and reinvested the capital, time, and talent to build this department or division over a long-range period.

*Internal Revenue Service Report of Corporation Income Tax Returns, July 1961 to June 1962.

It was also true that some of the formerly successful shoe exporters became handlers of odd-lot merchandise and exploiters of certain markets. Some of these markets still exist today and are being sold by these companies.

Generally the experiences of successful American shoe exporters have shown the cost of selling to be higher, the costs of samples to be higher, etc., but these are reflected in profits also. However, it is interesting to note that credit losses (even where open accounts are extended) appear to be extremely low in comparison to American-company trading losses.

One export manager summarized the requirements for success by stating, "You must minimize the communications and maximize the flow of goods". He was referring to American exporters being able to provide the necessary services both prior to and following shipment in order to satisfy both the small and the large foreign customer. Another successful export manager summarized his thoughts by saying, "It requires a salesman in order to sell American-made shoes overseas. An order taker cannot pay his way".

Another man, experienced in export selling, related that the selling function most generally overlooked, regardless of the product, is usually the after-sales service (e.g., the manufacturer helping the retailer to move the product off his shelf into the consumers' possession). The shoe industry in the United States has been very conscious of the importance of this function and has emphasized not only the selling of the retailer, but also preconditioning the public through mass-media advertising and merchandising aids and the training of salesmen. "This is not to say it cannot be done better here in the United States", stated this spokesman, "but in selling export markets this function has not been accomplished nor has it been attempted, primarily because it is costly. However, it can be very profitable in the long run in building dealer or import-agent loyalty and paying off in consumer preference".

Another spokesman stated that in the United States the drummer salesman (known for years in the shoe industry and formerly quite common in many other industries) is giving way to the company representative who has a "service territory". Another observer noted that it is important to know your market and the buying habits of the people whom you are attempting to sell, as we do here in the United States. He concluded, "Armchair exporting is doomed to failure".

One of the reasons for the success of one of the casual-shoe manufacturers is the overseas sales follow-through that they use, which is similar to point-of-sale merchandising used in the United States. It was admitted that the product is riding an extremely good demand curve, which makes reasons for success easier to express and such promotions easier to afford. This product is being both produced and exported overseas.

It was interesting to note the number of times that the need for better distribution in foreign countries was mentioned during interviews. Interviewees referred to the success in foreign countries of the American-type supermarkets, dry-goods stores, and variety stores. To be successful in such activity generally requires long-range planning, available capital, and a minimum 5-year payoff schedule. It also usually involves some type of joint venture with mutual investment in personnel, facilities, and other marketable assets. This kind of interest on the part of several American manufacturers was reported but could not be verified. It was also reported that advertising and sales promotion in the shoe industry is not very well developed in Europe.

Case Histories

The following case histories were taken from the files of Battelle shoe-industry field interviews. The information is accurate and is cited to give practical evidence of typical activities. However, names and identifications have been intentionally disguised at the request of the interviewees.

Company A - Manufactures boots. Has experienced good export demand. Received a large order from France. Papers cleared satisfactorily. Order was produced, packed, and shipped. It arrived at the foreign port and merchandise was accepted. Importer then began complaints on size, color, style, and stopped payment. After much debate, order was finally repacked and shipped back to United States manufacturer. Losses were experienced in time, freight, insurance, handling, etc. This company management is not anxious to discuss exports anywhere.

Company B - Manufactures women's and girl's shoes. Had excellent arrangement with large English company to export and produce there. Lasts were sent, technicians visited, people were trained and shipments went through satisfactorily. Some problems were encountered but were overcome. The company in England became a part of a large cartel. Interest in Company B declined to nothing. License was dissolved.

Company C - Manufactures full line of shoes. In England, American exports were well received but short lived. Reason was that the agent was not self-sufficient and that the company (by its own admission) did not work very closely with him. Results have been spotty to poor.

Company C - Same company as above. In France, export attempts did not succeed at all during the first year. During the second year, after much screening, a good agent was employed. The third year, the same prospects who reportedly did not speak English earlier, conversed in fluent English and have become excellent customers for American shoes in France.

Company D - Manufactures women's and girl's shoes. Reported that its French and English licensees failed "miserably". Still, it has good licensees in Italy and Australia. Its products also are enjoying good export volume to England and Switzerland.

Company E - Manufactures men's shoes. Export sales have generally enjoyed good success. The firm has an excellent relationship with an unusually good Latin American export agent in addition to licensees in France and Australia. It is reportedly financially interested in retail stores in key markets that serve to give it listening posts to foreign fashion development and consumer demand.

Company F - Manufactures men's shoes. Started export company 3 years ago. Invested nearly $100,000; has planned and built volume to include products other than its own shoes. Young management reflects great optimism.

Company G - Manufactures men's shoes. The licensee in Mexico "never did make any money". Conversely, Canadian operations have been quite successful. Reason noted was that Mexican principals always come to the United States plant, whereas United States company officials exchange freely and work closely with Canadian operations in Canada. Today, pressure of other businesses limits further activities in foreign markets.

Company H - Manufactures full line of shoes. Has followed up on numerous leads published as "interested foreign buyers for shoes". Found that after much exchange of correspondence, samples, etc., active interest faded into no replies to further letters to these foreign prospects.

U. S. Exporting, Importing and Licensing

Export data for nonrubber footwear are shown in Table 14 for the years 1961 through preliminary 1965. These data show how United States exports have fluctuated, particularly in key countries. A better picture can be seen from Figure 8, which shows United States shoe imports may be leveling off. There is evidence that American shoe exports may in the future reverse a downward trend, thus confirming the opinions received in field interviews (especially from the hand-sewn-shoe manufacturers) that there is considerable current interest in exports. It also partially explains the increase in exports into countries formerly losing American export interest.

The outlook seen by Battelle for American shoe exports is that they will parallel all types of exports and imports from the United States (which are expected to at least double over the next 10 years).* With the outlook for fewer shoe manufacturers in the United States, the efforts of the United States Government to balance international trade, improvements in shoe technology, and rising foreign shoe-production costs, the differential in prices should narrow appreciably, thereby offering shoe-export opportunities unavailable in recent years.

Data on nonrubber-footwear imports into the United States were given in Table 11. There has been increasing import activity in all lines of Italian-made shoes except for moccasins, which have decreased. Other countries, such as Spain and France, show an increase primarily in men's shoes, while Japanese-shoe imports show increases in women's shoes.

Some comment should be made on the expressed interest of certain foreign countries to cooperate in an orderly shoe-trading program. Those countries that appear favorable to American overtures on the subject do not appear to be highly active in other export markets. Conversely, those countries (such as Italy) that do not appear ready to negotiate orderly marketing procedures are generally doing a very aggressive promotion of their exports into other key markets. Their advances in some of these markets has been at the expense of sales volume formerly supplied by American shoe exporters.

Information on licensing also was gained during the industry field interviews.

*Boot and Shoe Recorder.

TABLE 14. UNITED STATES EXPORTS OF NONRUBBER FOOTWEAR BY

	Totals		Canada		Mexico		Netherlands Antilles		Panama		Bahamas	
	Pairs	Value, $	Pairs	Value, $	Pairs	Value, $	Pairs	Value, $	Pairs	Value, $	Pairs	Value, $
1965	2,491,038	7,829,566	435,752	1,273,898	396,223	1,170,559	296,577	756,615	61,636	234,460	254,604	689,404
1964	2,835,562	8,540,199	473,362	1,450,190	364,159	1,251,923	378,154	995,136	81,926	236,801	244,633	604,659
1963	2,842,757	8,627,703	271,816	1,144,059	358,795	1,232,001	328,432	900,152	122,314	427,092	211,082	549,317
1962	2,867,379	8,698,073	402,645	1,624,168	314,638	1,116,380	336,651	942,151	119,826	438,132	199,583	494,972
1961	3,007,195	6,985,431	565,327	2,020,084	306,010	1,035,383	373,653	1,020,745	159,731	522,140	209,272	519,735
												Average Price Per
1965		3.14		2.92		3.95		2.55		3.80		2.71
1964		3.01		3.06		3.44		2.63		2.89		2.47
1963		3.03		4.21		3.43		2.74		3.49		2.60
1962		3.03		4.03		3.55		2.80		3.66		2.48
1961		2.99		3.57		3.38		2.73		3.27		2.48
												Men's
1965	573,189	3,122,841	60,604	230,223	132,497	748,183	51,567	267,562	8,848	90,172	64,301	270,342
1964	629,705	3,519,971	87,072	479,213	115,262	659,588	88,694	380,781	7,957	51,999	54,240	212,475
1963	571,498	3,238,193	69,154	466,651	97,212	561,849	65,941	295,922	16,971	105,785	43,983	173,297
1962	504,613	2,569,445	59,476	365,638	77,737	456,592	69,100	306,446	10,171	72,339	38,910	137,031
1961	442,106	2,476,216	67,155	411,156	88,982	455,095	66,973	305,491	15,261	99,796	31,033	120,778
												Women's
1965	1,080,562	3,039,482	188,372	591,013	155,362	401,669	142,266	349,015	23,730	95,710	141,967	328,101
1964	1,016,985	3,233,571	110,054	649,696	186,550	507,044	182,754	445,823	39,401	131,472	104,207	258,441
1963	1,125,437	3,570,961	85,096	509,019	244,145	638,181	137,845	362,128	65,328	236,391	100,618	246,955
1962	1,277,507	4,235,507	176,343	950,856	216,222	606,028	165,068	435,625	76,514	289,261	100,037	250,686
1961	1,391,460	4,643,007	229,288	1,208,586	200,026	546,981	188,883	495,409	94,865	312,860	119,583	300,948
												Infants' and
1965	160,557	276,119	21,935	19,999	3,796	5,381	12,089	24,225	9,931	22,138	35,292	70,269
1964	146,318	293,950	11,989	24,268	6,046	11,996	19,975	36,679	7,682	17,367	31,112	61,237
1963	211,211	429,166	6,120	13,541	10,238	22,301	30,620	60,515	11,934	26,046	31,716	63,181
1962	258,060	543,908	9,943	28,206	15,022	44,009	36,490	74,556	13,047	27,985	29,556	56,587
1961	230,204	465,014	10,827	28,024	11,812	24,290	46,456	92,105	21,272	44,365	27,349	47,185
												Slippers and Moccasins for
1965	430,961	623,499	106,660	157,388	1,944	2,613	88,129	101,941	17,167	19,204	8,917	11,217
1964	119,359	229,085	3,340	12,170	35,043	35,806	17,092	26,143	3,583	6,226	820	2,867
1963	128,832	264,666	4,491	14,163	355	1,056	16,907	36,357	4,521	10,513	2,008	4,405
1962	79,061	193,634	15,291	39,717	762	1,770	14,541	33,943	2,298	6,016	3,062	5,345
1961	84,807	195,543	13,378	40,098	390	1,340	20,408	38,912	1,558	3,912	1,385	3,863

Source: Bureau of the Census, U.S. Department of Commerce

(a) Average price per exported pair computed by Business and Defense Services Administration.

CLASSIFICATION AND PRINCIPAL MARKETS, 1961-1964 AND PRELIMINARY 1965

Bermuda		Hong Kong		United Kingdom		Dominican Republic		Other	
Pairs	Value, $	Pairs	Value, $	Pairs	Value, $	Pairs	Value, $	Pairs	Value, $
120,291	406,410	85,067	446,352	92,825	164,201	37,557	224,558	810,396	2,461,109
139,561	424,843	101,022	436,779	74,612	179,314	145,710	518,911	832,423	2,441,643
151,309	492,367	95,372	432,177	175,303	503,757	205,020	494,599	923,314	2,452,182
152,024	482,671	102,121	410,767	96,310	219,723	74,299	232,856	1,069,282	2,736,253
161,880	512,344	83,720	303,020	153,433	235,114	13,966	54,917	980,203	2,761,949
Exported Pair[a]									
	3.38		5.25		1.77		6.03		3.04
	3.04		4.32		2.40		3.56		2.93
	3.25		4.53		2.87		2.41		2.66
	3.17		4.02		2.28		3.13		2.56
	3.16		3.62		1.53		3.93		2.82
and Boys									
17,028	80,132	29,524	236,185	2,601	14,756	16,705	125,424	189,514	1,059,862
15,648	76,559	21,648	192,305	5,142	25,234	69,211	467,543	164,831	974,274
21,572	105,321	23,004	228,696	42,157	169,596	67,936	377,214	123,568	753,862
26,344	105,619	24,255	179,699	12,346	51,554	23,499	123,783	162,775	770,744
24,584	94,996	13,111	125,729	2,675	17,065	3,988	27,176	128,344	818,934
and Misses'									
75,239	267,256	43,856	169,547	1,468	12,059	9,706	23,154	298,594	801,958
68,129	236,409	45,046	169,693	11,122	40,129	7,347	22,016	262,375	772,848
70,187	257,864	42,968	147,431	33,967	128,481	7,867	20,170	337,416	1,024,341
78,794	277,910	49,503	172,347	10,308	55,771	11,910	41,186	392,808	1,155,837
99,689	334,101	39,632	137,304	14,319	50,884	6,327	21,789	398,848	1,234,145
Children's									
16,538	38,417	96	438	648	1,137	1,318	3,425	58,914	90,690
18,234	40,269	2,099	4,931	3,718	4,116	1,290	2,989	44,173	90,098
26,897	56,503	2,943	6,319	9,185	18,282	3,144	5,725	78,414	156,753
20,254	41,755	5,794	16,299	4,942	9,733	708	2,841	122,304	241,937
20,184	46,434	5,157	10,787	--	--	520	1,016	86,627	170,808
Housewear, Leather Uppers									
9,629	17,537	5,614	14,849	80,340	124,197	527	731	112,034	173,822
2,003	5,754	2,708	5,397	24,097	47,642	1,297	2,594	29,376	84,486
3,611	9,706	3,943	9,525	49,655	99,126	1,401	3,777	41,940	76,038
3,872	10,515	1,218	2,920	6,279	15,283	820	2,313	30,918	75,812
3,992	9,410	452	996	14,029	26,680	438	1,072	28,777	69,260

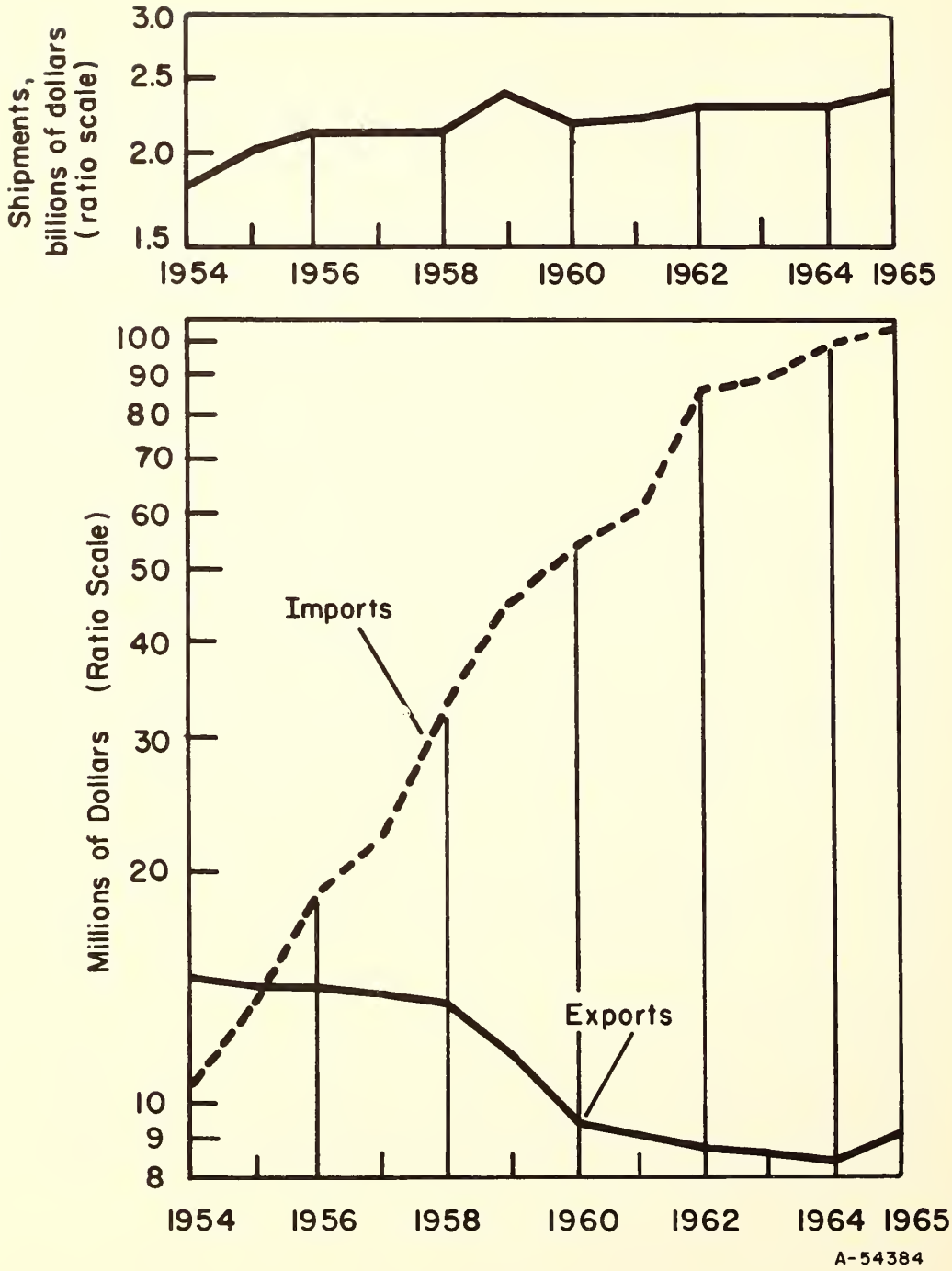

FIGURE 8. UNITED STATES NONRUBBER FOOTWEAR EXPORTS AND IMPORTS, 1954-1966

Source: U. S. Department of Commerce

Data on royalties reported to the Internal Revenue Service by leather-goods manufacturers indicate that approximately one-third are footwear manufacturers. In a total of 2,982 returns of companies having total assets of $1,912,804,000, total royalty income was $553,000. Of this, $506,000 was obtained from 143 companies with assets over $1,000,000; 126 companies with assets over $2.5 million; 70 companies with assets over $5 million; and 167 companies with assets of $10 to $50 million.* This gives a preliminary indication of the size of companies that are engaged in foreign licensing. Field information indicates that the length of time that most of the licenses have been in effect has not been sufficient to obtain a true picture of the success or failure of these licensing agreements.

Figure 9 illustrates the time span and activities relationship in the foreign licensing of shoes. Some companies have made a profit, others have been able to return dollars, others have failed. Examples A and B are more typical than Example C in the shoe industry.

Shoe exports and imports, or a world flow of shoes, relate closely to the differential of labor rates in different countries at different periods of time. This is because shoes generally are classified in broad categories, a major portion of which are either nondress shoes or are lower-priced dress shoes, which make price very critical to trade. Thus, any country enjoying a low labor rate, or a surplus of labor that can become skilled in shoe production, becomes a natural focal point for shoe production.

A preliminary analysis was made in an effort to develop a large flow chart of key-country imports and exports of shoes. This was found not to be helpful to drawing conclusions, other than to confirm that labor was critical because of price competition. Production locations change as one country's economy progresses faster than another's. Examples of this were cited earlier in the text regarding competition and cost in the labor market in Germany, France, and Italy versus that of Spain.

Figure 10 shows the channels of shoe imports into the United States. Figure 11 is included also as a concise summary of the flow of foreign-made and United States-made shoes by United States shoe manufacturers and/or marketers. Note that imports come into the country, not only to United States manufacturers but also to large marketers who contract all their production. This provided implications which were considered in the conclusions chapter of this report.

Summary on Current Status of Foreign Marketing Activities

A sample of 55 names was received from the Sponsor. Twenty-seven percent of these were identified as known current exporters. Forty percent were listed as not exporting, and 33 percent had unknown experience in exporting. These companies included manufacturers of all kinds of shoes.

The analysis of field interviews by Battelle shows that 37 percent of the companies contacted are currently exporting and 31 percent have no foreign activity to report. However, half of all the companies in the sample also were importing currently, and 37 percent reported foreign licensing of production. (These percentage figures total more than 100 because of the overlap of activity areas.)

*Internal Revenue Service Report of Corporation Income Tax Returns, July 1961 to June 1962.

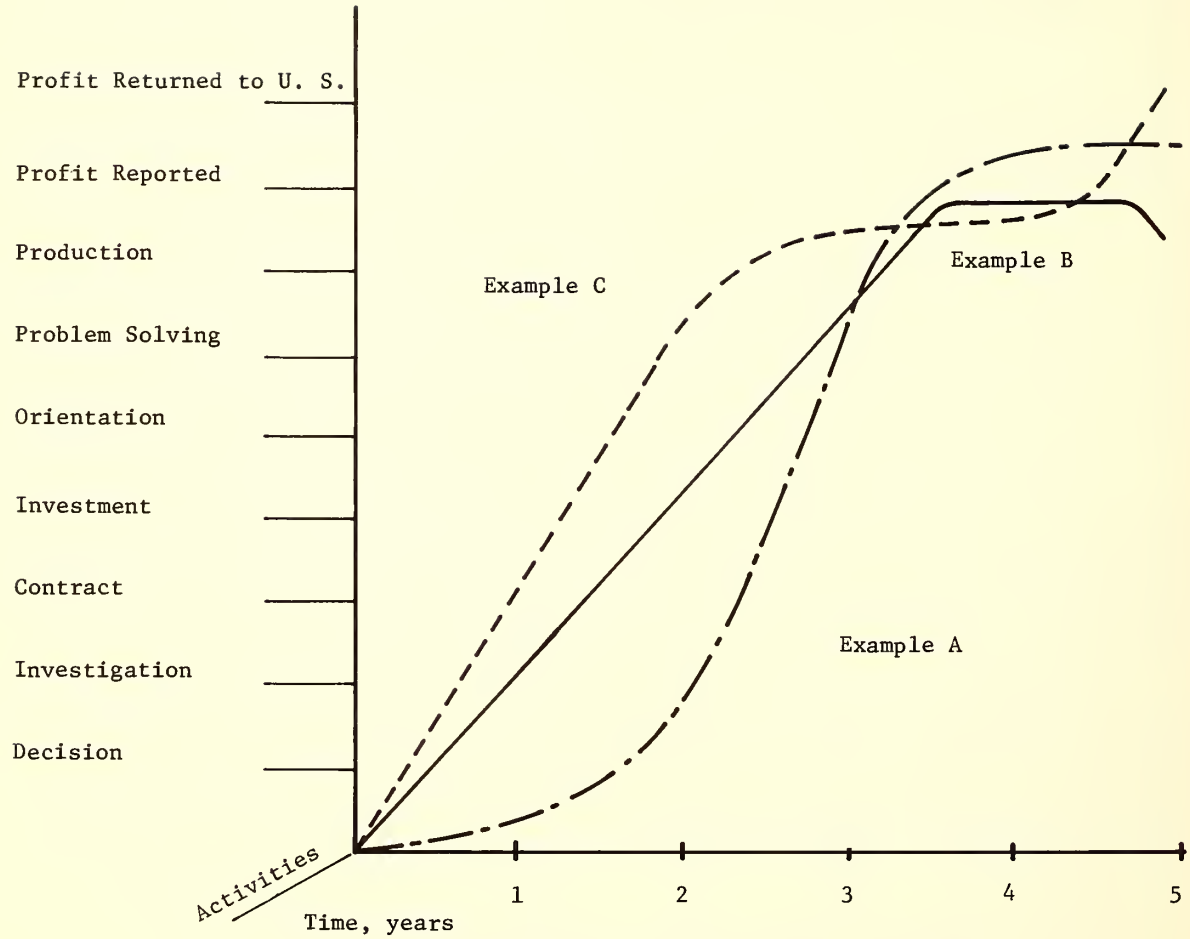

FIGURE 9. RELATIONSHIP OF FOREIGN LICENSING ACTIVITY AND TIME SPAN

Source: Battelle.

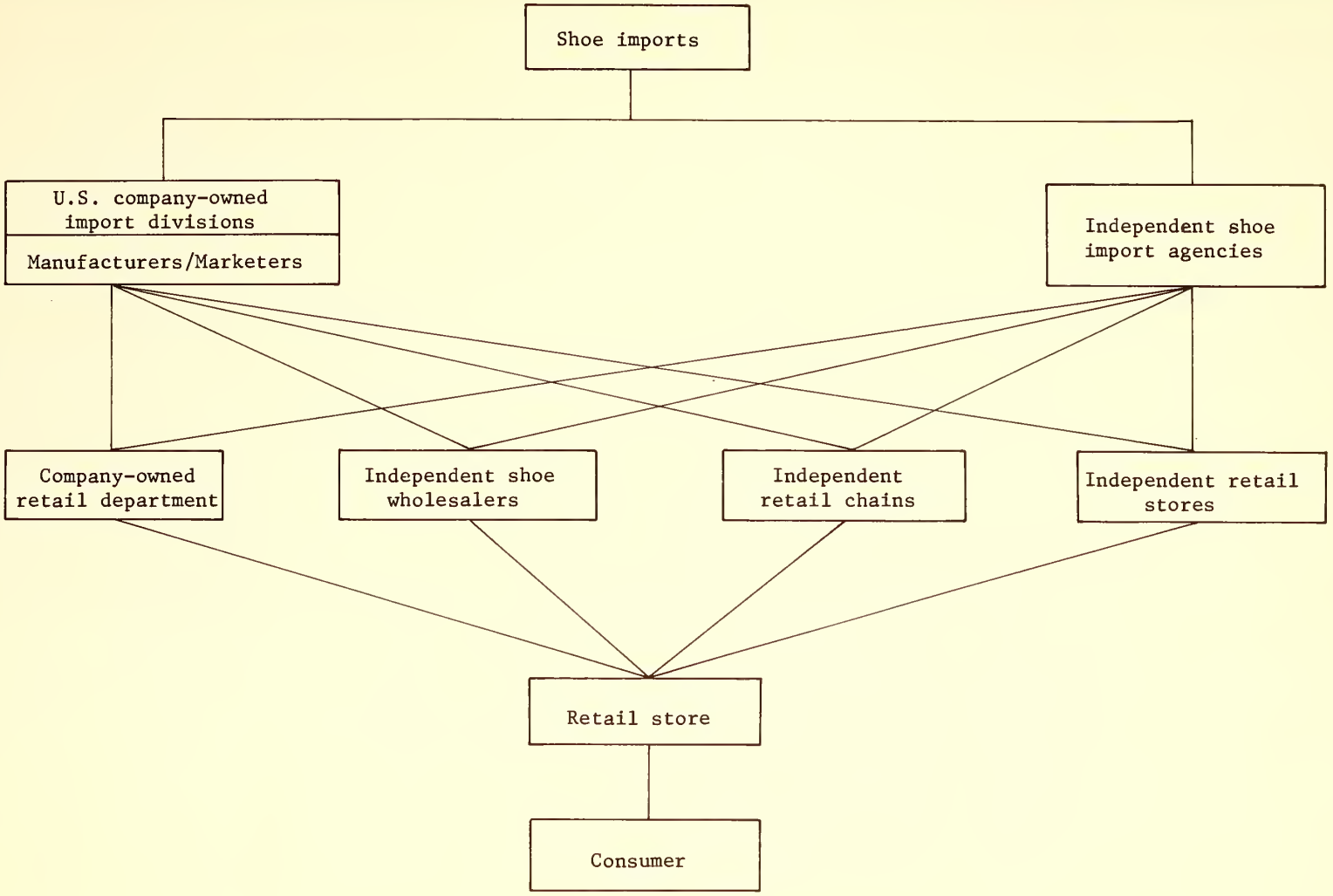

FIGURE 10. CHANNELS OF SHOE IMPORTS INTO THE U.S.

Source: Battelle.

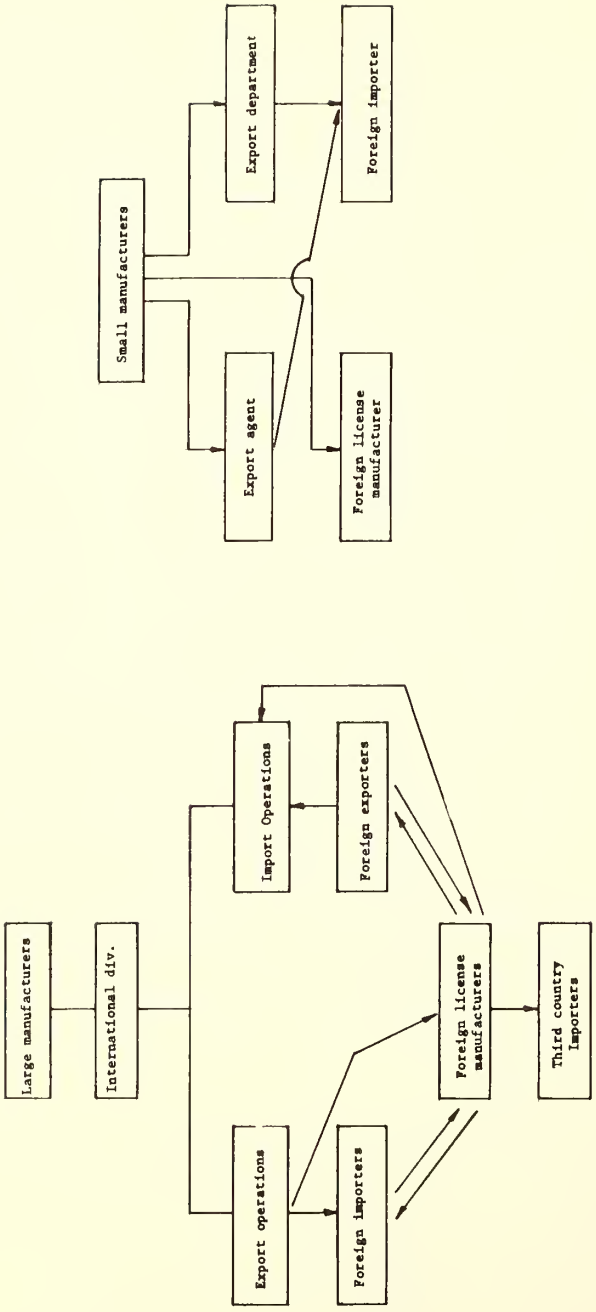

FIGURE 11. CURRENT INTERNATIONAL MARKETING CHANNELS OF AMERICAN SHOE MANUFACTURERS

Source: Battelle.

The important conclusion to be derived from these figures is that a major portion of the industry leaders are not unfamiliar with foreign marketing, and that a discussion and reporting on exports alone proved to be a difficult limitation because of the other activities in which the management of these companies were engaged.

Exporting of American shoes was greatest following World War II and has since been declining. However, because of the fewer numbers of companies exporting, the current activities are spread over fewer exporters and the relative volume position of each is comparatively stable and/or improving.

The destination of exports also is changing in an inverse relation to the development of shoe manufacturing within former large export market areas. For example, Caribbean, Central American, and northern South American countries in the past have been prime market areas for many United States manufacturers who now report no export activity at all in those areas. These markets have become unavailable to American exporters because governments began protecting local industry as their manufacturing capabilities became competitive.

In analyzing companies in this category, the following profile can be seen. These companies were manufacturers of men's or women's shoes with a middle-of-the-line price structure. The president or owner, usually of a family-owned company, developed initial business through Caribbean cruises when foreign travel resumed after World War II. As agents and contacts developed, volume was generated and standard American shoe products were exported with a great deal of success. As local manufacturing capabilities progressed, price became more of a problem. Increasing hindrances, such as changing quotas, tariff regulations, etc., gradually became too large to be overcome by a manufacturer who was facing increased competition at home, increasing labor and material costs, labor and facilities problems, etc.

When post-war markets began to close to American shoe exports, there were companies that saw diversification possibilities in export markets and moved to establish export companies or divisions with the capability of selling anywhere in the world. These companies committed personnel and capital resources to accomplish this goal. They developed in two ways - one where shoes were the main export items, and the other where shoes were not the main export item.

There also were companies that wanted to sell overseas for one reason or another, but chose to do so by way of licensing. This route of development had two results - success or failure - with very few instances in between these two extremes. Those that failed did so for the same basic reasons that most overseas ventures fail. Those that succeeded did so because they put forth the extra effort to cooperate technically and to build on personal loyalties. These companies have continued.

When European and Japanese markets became rebuilt they began to compete in the United States market and imports looked like they were invincible, these companies then used their own licensees or contracted production and imported to themselves and imported for others. This activity has had two advantages. It has helped their relationships with foreign producers and it has helped a number of United States firms to profit and control import sources.

ANALYSIS OF SPONSOR-SUPPLIED DATA

Battelle was able to analyze most of the data and information provided to the project staff. However, it was not possible to quantify the enormous amount of raw data from the various countries to yield a numerical priority of potential markets. In the first place, the data were not classified under any standard nomenclature for all countries. Second, the data available for any one country often were not consistent in the sequential years desired. Third, there was little uniform comparison for all countries by any desired measure over any given period of time. Total figures were valuable, but the subdivisions that would indicate actual target markets were not readily available. For example, a country importing large numbers of men's shoes gives little indication of the specific potential for work shoes versus hand-sewn loafers or brogues at a certain price. Definitions of size, weight, etc., also differed, as did description of men's and boy's shoes versus men's only. Some tariffs were levied on weight, others by pairs, and shoes by type vary considerably in weight.

Another deterrent to saying, "Here is a market for X shoes", is that a company already selling that particular market does not readily admit it or wish to divulge detailed data. Unfortunately, there is also usually a considerable difference between the published data indicating a market and the actual activity or requirement to obtain results in that market. It was necessary, therefore, to use a combination of qualified judgments and semiquantitative analysis.

The procedure followed was to standardize the pertinent data as much as possible within an analysis matrix shown in Figure 12. A list of important considerations for each of 22 countries is presented. From this chart, a priority of countries for personal visitation was developed. The logic followed was that if import restrictions were within reason, there was a potential; American shoes could be imported. Second, if the socioeconomic level was satisfactory, there was potentially an ability to buy American shoes.

A third criterion was whether business conditions were such that American businessmen could understand and work with them. The distribution channels were rated as to how to sell American shoes in a given country. Using the key, G-Good, F-Fair, P-Poor, these countries were judged according to the data received from the foreign desks of the Department of Commerce. In the case of importing restrictions, X was used to denote extreme restrictions (where the ad valorem CIF value was taxed at 25 percent or more). The letter Y was used to denote other import restrictions such as import licenses required, advance deposits on the part of the importer required, or other types of restrictions.

Approximately 12 countries survived this analysis as potential markets. These were then analyzed in more detail and keyed with either a G for Good or an N for Negative. A country would be shown as negative for various reasons, such as a small volume potential or reports from the foreign commercial counselor stating that "American shoe styles would not sell in that country".

Sweden and France became the top two countries for in-depth market studies. Hong Kong, while it appears to have a good potential, was not rated highly for visitation because of its isolated location and its limited current potential due to hostilities in Viet Nam.

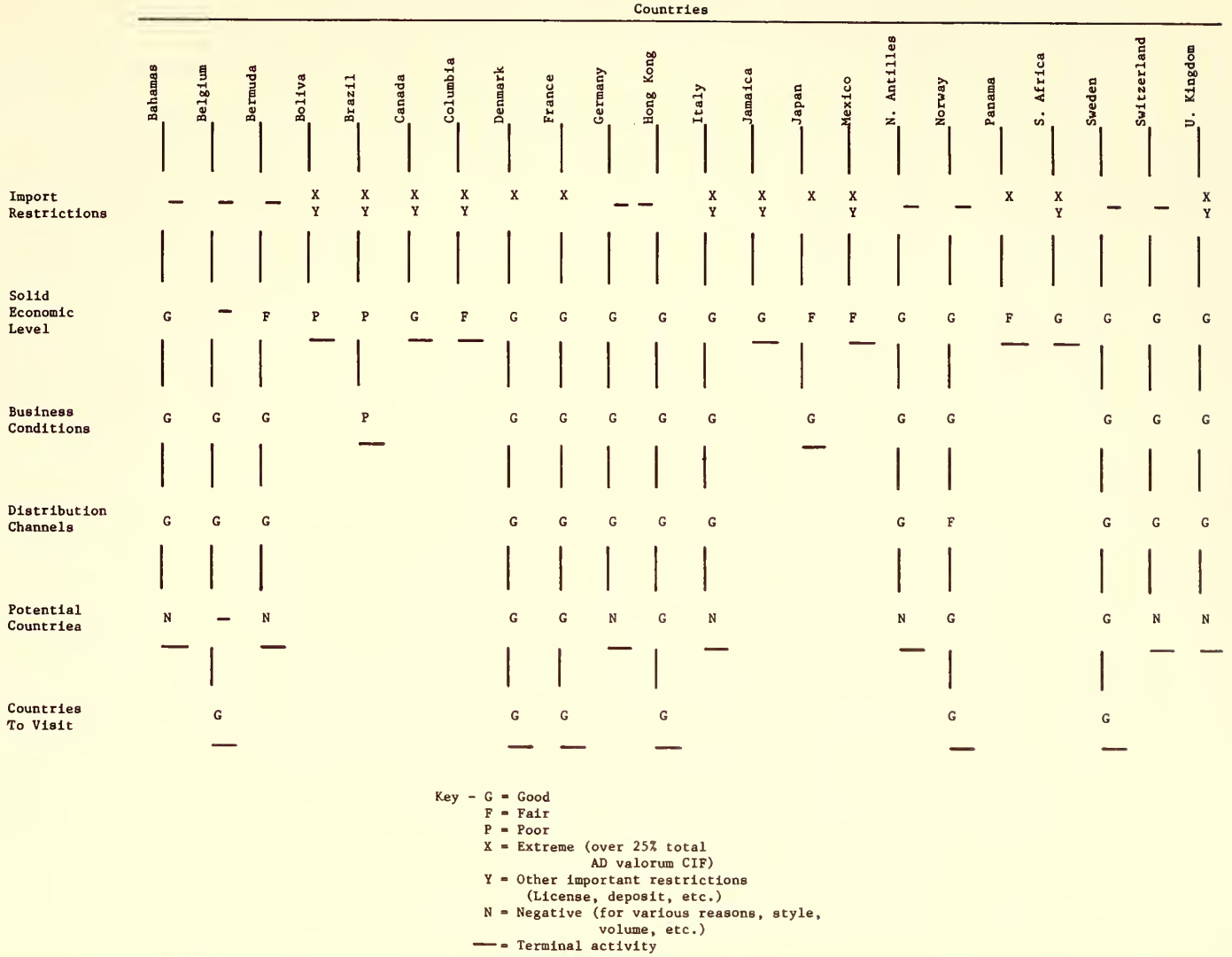

FIGURE 12. SHOE EXPORT MARKET POTENTIAL BASED ON ANALYSIS OF FOREIGN COMMERCE DATA, BY COUNTRY AND BY CONDITION

Source: Raw data, U. S. Dept. of Commerce.

To support the qualitative analysis with a quantitative analysis, a table was developed showing the 22 countries, their population, their recent import history, and the United States share in those imports for the years 1964, 1963, and 1962. (See Table 15). This approach again indicated that Sweden and France offer the most promising potential. Domestic field interview data supported this conclusion.

Sweden was rated "High" because (1) the country encourages foreign trade and has the fewest restrictions on imports, (2) the standard of living is the highest in Europe and among the highest in the world, (3) a statistical analysis of the dossier of data proved to be very positive, (4) this country was among those mentioned in field interviews, and (5) it holds a position of leadership in the Scandinavian countries.

France was chosen for similar reasons, as well as for its position in Central Europe and its large population. Belgium, while not statistically a currently attractive market, was visited because of its location and position as the center of the European Economic Community. These countries were visited by Battelle staff members in early 1966. Results of this field work are presented in later chapters.

JRM/jm

TABLE 15. POPULATION, TOTAL NONRUBBER FOOTWEAR IMPORTS, AND IMPORTS OF NONRUBBER FOOTWEAR FROM THE U. S., 1962-64, SELECTED COUNTRIES

Quantities in pairs unless otherwise noted

Country	Population	Year	Total Imports	U. S. Exports
Bahamas	136,229	1964	NA[a]	244,633
		1963	NA	211,082
		1962	NA	199,583
Belgium	9,280,000	1964	6,737,000[b]	3,773[b]
		1963	6,144,000[b]	3,881[b]
		1962	6,183,000[b]	3,576[b]
Bermuda	45,000	1964	10,420 c/s	139,561
		1963	NA	151,309
		1962	NA	152,024
Bolivia	3,850,000	1964	NA	67,655
		1963	NA	68,481
		1962	NA	76,994
Brazil	75,000,000	1964	NA	3,672
		1963	NA	3,697
		1962	16,730	13,653
Canada	19,000,000	1964	18,035,531	473,362
		1963	14,524,896	271,816
		1962	14,181,270	402,645
Colombia	14,500,000	1964	49,873	44,550
		1963	28,296	54,930
		1962	24,078	33,723
Denmark	4,585,000	1964	NA	29,968
		1963	24,411	2,631
		1962	17,776	2,463
Germany	55,600,000	1964	27,492,628	16,900
		1963	31,999,489	12,153
		1962	25,907,802	16,855
Hong Kong	3,800,000	1964	4,720,008	101,022
		1963	2,410,716	95,372
		1962	2,516,412	102,121
Italy	52,000,000	1964	1,116,300	25,017
		1963	911,355	70,689
		1962	624,550	33,816

TABLE 15. (Continued)

Country	Population	Year	Total Imports	U. S. Exports
Jamaica	1,750,000	1964	NA	26,757
		1963	402,430	17,345
		1962	475,906	21,544
Japan	96,240,000	1964	287,136	16,539
		1963	184,440	14,146
		1962	6,972	27,621
Mexico	38,416,000	1964	NA	364,159
		1963	17,594	358,795
		1962	12,356	314,638
Netherlands Antilles	204,000	1964	833,820	378,154
		1963	769,896	328,432
		1962	704,424	336,651
Norway	3,700,000	1964	NA	509
		1963	1,018 ton	1,245
		1962	863 ton	326
Panama	1,000,000	1964	NA	81,926
		1963	NA	122,314
		1962	704,043	119,826
South Africa	15,841,128	1964	NA	57,498
		1963	1,800,773	41,693
		1962	1,114,216	24,138
Sweden	7,580,000	1964	11,291,011	26,275
		1963	8,804,779	35,520
		1962	7,037,250	25,926
Switzerland	5,600,000	1964	6,626,748	46,607
		1963	5,470,300	38,561
		1962	4,508,490	41,719
United Kingdom	46,669,000	1964	33,546,313	74,612
		1963	29,949,249	175,303
		1962	29,861,106	96,310
France	47,600,000	1964	12,928,870	28,589
		1963	10,269,010	14,645
		1962	6,390,560	13,139

(a) Indicates data not available.
(b) Includes Luxembourg.

APPENDIX A

ANALYSES OF FOREIGN MARKETS

Summary of the Swedish Market

Through the cooperation of the commercial staff on the American Embassy and members of the American Trade Center staff in Stockholm, it was possible to meet and have extended interviews with a wide array of information sources regarding the shoe industry in Sweden. Discussions were held with research personnel, economists in the financial community, industry-association personnel, department-store buyers, publicity and promotion people, and agents and retailers who had been both successful and unsuccessful with American shoes. Interviews were held with owners of these retail companies as well as with sales personnel. Every effort was made to obtain as complete an in-depth picture as possible.

Currently, it can be stated that the Swedish market is relatively untested for American shoes. Those American shoes that are selling there are well liked by buyers, are priced slightly higher than those of the competition, and have generally survived cheap foreign copies. The current market is quite stratified and the competition is predominantly from English, Italian, French, and Swiss manufacturers.

Labor cost in Sweden is no longer an advantage. In fact, some major manufacturers are moving their production to Southern Europe. Many other changes are taking place within the Swedish shoe industry.

Shoe prices, as well as other consumer-product prices, are relatively high, although the Swedish people appear to be extremely willing to buy items that are new or items which carry American labels. The standard of living in Sweden is comparable to that in the United States.

Distribution channels are very well organized, and merchandising methods are quite advanced. Swiss and English shoe manufacturers have made a rather extensive marketing investment over a period of time. Swiss Bally shoes have had a Bally Store as a part of the NK cooperative department store for approximately 50 years. The English Playboy shoe has made definite inroads over the past 3 to 4 years. However, it has required aggressive promotion.

Conversely, French and Italian manufacturers have relied upon their style leadership and comparatively low price to capture a share of the market without a comparable marketing investment. Unfortunately, there appears to be a lack of trust within the import-marketing channels. Reputation and ability to deliver are exceedingly important.

Potentially, it appears that if other manufacturers have invested in the promotion of brand names through department stores and through their own retail stores that American manufacturers could combine their efforts and do likewise. While this market is considered quite small, it is an ideal test area for style and market evaluation. Thus, if the French, Italian, or American style can be sold in Stockholm, the opportunities for selling elsewhere should be considerably enhanced.

It may be theorized that if the United States should gain more of a production technology advantage and/or a style leadership in the foreseeable future, an investment in marketing capability well in advance of this development could help American shoes capture a larger share of the market.

After-sales service, delivery, and training of personnel are considered extremely important in the Swedish market. Such services might well be provided by a cooperative organization of American manufacturers, even though the distance is greater than that encountered by European manufacturers operating individually.

To date, there is only one Swedish shoe importer who has recognized the need for providing the warehousing function as an adjunct to sales-reorder service. If the cost of this service and function were spread over a correct product mix and volume, an American sales organization could offer this advantage also. The margin for the selling function only can range from 2 percent on large orders to 20 percent on smaller orders or where a warehousing function is provided. It is believed that a warehousing function could greatly enhance the possibility of American-shoe acceptance.

It is further felt that this export operation can be made profitable as long as competitive strategy and shrewd management keep the products offered from competing with low price and highly changing styles. In other words, one must choose the correct product mix and merchandise without becoming involved in the many competitive moves taking place in certain types of product sales.

As an example, it was reported that a man's shoe in several styles and a variety of widths and sizes should be delivered to the retailer for approximately 50 to 55 Kr per pair. The retailer would add an 85 percent factor, plus allowances for promotion from the supplier, plus the 10 percent sales tax. It would then be up to the supplier to cooperate with the retailer and to promote the product benefits accordingly. In addition, normal business credit should be provided, as well as a reorder service.

Building an awareness of the benefits of American-made shoes, according to wholesalers and retailers, would require 3 years before yielding a profitable mutual volume. This confirms the comments made by a number of individual commercial sources and the report by foreign embassy commercial personnel that the immediate outlook for increasing the United States' share of the Swedish market for all kinds of leather footwear is not very promising unless this effort is accompanied by an active advertising and sales-promotion campaign. Potentially the market shows promise, if supported by an adequate investment in marketing capability.

Summary of French Market

American shoes in France currently face extreme competition, primarily from Italian shoes and French shoes. However, leadership in such areas as rounded toes in women's shoes, light leather colors, boots, and teen-age clothing styles was quickly credited to the United States.

There is a trend toward the purchase of cheaper shoes, so that instead of repairing them, shoes can be thrown away and a new pair purchased. There also is a market for

better dress shoes – the type that a person would have as "one good pair". Increasing production costs are making French-produced shoe prices more competitive with those in other European countries and the United States. Americanism and bigness are feared in the retail trade, but there are indications that trends toward acceptance of certain goods and practices are in an early stage of change. Other socioeconomic changes indicate that these trends will parallel those in the United States. However, current resistance in the marketing channels can tend to hold back some of this development. One firm indication of the socioeconomic development is the better fit options being offered, especially in women's shoes.

Records indicate that the United States is France's most important single supplier of all types of imports; and, excluding Canada, France is the fourth largest supplier of United States shoe imports. In large measure, trade between the United States and France is complementary.

The broad statement can be made that anything can be sold in some quantity in any market at a given time. However, to the commercial-minded manager interested in return on invested capital, the cost may not be justified in comparison to other business alternatives. An American manager may say to himself, "The French market is big. Its population equals that of New York, New Jersey, Pennsylvania, and all of New England combined. But if the marketing methods are like ours used to be, if there is resistance to our current methods, if warehousing is necessary, if capital must be invested, and if there is the risk that profits cannot be taken from the country, the total unknowns become very great. Maybe I would be better off over the next couple of years to try to improve my position at home through methods I know will pay off."

This situation is currently true in the French market and may explain some of the apparent conflict of opinion between American Government representatives there and American manufacturers who have studied these foreign markets.

Potentially, however, the market appears promising, as evidenced by a number of indicators, not the least of which is the fact that several large American shoe manufacturers are in the preliminary stages of developing a marketing capability in France. Therefore, it would follow that a number of smaller American manufacturers cooperating toward a common goal and with the proper capabilities could similarly develop marketing capabilities in France. One possibility would be to supply the French market from a European Economic Community distribution point outside of France, since duties are scheduled to be eliminated.

Summary of Belgium Visitation

Belgium is a trading country. Approximately 40 percent of its gross national product comes from the importation, processing, and exporting or consumption of goods.

Distribution channels are still old fashioned, appealing to the small-unit buyer; but according to industry sources, this is beginning to change. It is estimated that 80 percent of Belgium shoe production goes directly from its 385 manufacturers to about 6,000 retail outlets.

There are 550 to 560 American manufacturing firms established in Belgium, and some 200 of these process or fabricate there. Performance of the warehousing function

and providing modern facilities have been encouraged by the Belgian government. Bonding, financing, etc., are available. Free holding of goods without a transaction tax also is possible.

Informed sources report through the United States Mission to the EEC that shoes are considered an important part of the tariff negotiations currently being held in Geneva. Indications are that the tariff-reduction schedule will be maintained and possibly accelerated, depending upon the political implications. Internal EEC tariffs have been reduced approximately 80 percent. The goal of the external tariff on shoes is 16 percent when all countries converge their tariffs by 1970. There are some advocates who want shoes to be reduced further, possibly by another 50 percent. Thus, shoes could possibly end up with an 8 percent tariff, instead of 16 percent, by the early 1970's. It is evident that the EEC goal of becoming a United States of Europe with a single market of 180 million people could be advantageous to American shoe manufacturers. Indications are that Belgium potentially would be an excellent distribution point for American shoes in Europe.

ANALYSIS OF THE SWEDISH MARKET

Introduction

The gross national product for the United States in 1963 was $585,149,000,000. This was equal to $3,090 per capita. The corresponding figures for Sweden were $15,552,000,000 and $2,045 per capita. Thus, Sweden ranked behind only the United States and Canada in having the highest per capita gross national product in 1963, and this situation has continued. In 1963, the average annual income for gainfully occupied males was as follows: under 19 years, 7200 Kr; 20-24 years, 11,600 Kr; 25-29 years, 16,400 Kr; 30-49 years, 20,000 Kr; 50-65 years, 17,500 Kr; and over 65 years, 9300 Kr. (20,000 Kr equal approximately $3,861 U. S.)

The following table shows the Swedish index of industrial production compared with those of Belgium, France, and the United States.

TABLE A-1. INDEX OF INDUSTRIAL PRODUCTION, SELECTED COUNTRIES, 1960-1965

Country	1960	1961	1962	1963	1964	1965 (1st half)
Sweden	117	124	126	129	138	150
Belgium	111	116	123	130	140	144
France	110	116	123	129	138	144
United States	116	117	123	133	141	150

Source: Statistical Abstracts of Sweden, Central Bureau of Statistics, Stockholm, 1965.

Thus, it can be seen from the above table that Sweden's industrial production index has been very similar to that of the United States.

The consumer price index has risen considerably faster in Sweden than in the United States; this also is true in France and Belgium, as shown in Table A-2.

TABLE A-2. CONSUMER PRICE INDEX, SELECTED COUNTRIES, 1960-1965

Country	1960	1961	1962	1963	1964	1965 (1st half)
Sweden	105	107	112	115	119	124
Belgium	102	103	104	105	111	115
France	110	114	119	104	127	130
United States	102	103	105	106	107	108

Source: Statistical Abstracts of Sweden, Central Bureau of Statistics, Stockholm, 1965.

A similar situation is apparent for men's and women's ready-made suits, and men's overalls. Both demand and prices for these articles of clothing have been rising steadily since 1960, due in part to sport-clothes demand. On the other hand, prices for men's and women's shoes have declined. For example, the average price for men's shoes in 1960 was 59:25 Kr. In 1964, it was slightly less than 58 Kr. Women's shoes in 1960 were slightly less than 54 Kr, and in 1964 they were 48:75 Kr. At the same time, men's suits increased in price from 251 Kr to approximately 305 Kr, while women's suits increased from 232 Kr to 274 Kr.

The population of the trading area of the three largest cities in Sweden is as follows: Stockholm, 1,177,000; Gothenburg, 520,000; and Malmö, 269,000.

Table A-3 shows the relative age distribution for selected years and projected for 1970 and 1980.

TABLE A-3. AGE DISTRIBUTION IN SWEDEN, 1930, 1950, AND 1960, AND ESTIMATED AGE DISTRIBUTION, 1970 AND 1980

In Thousands

Year	20-29	30-49	50-64	65 and over
1930	1,062	1,622	809	566
1950	933	2,116	1,145	721
1960	896	2,096	1,359	871
1970	1,241	1,911	1,516	1,143
1980	1,100	2,165	1,459	1,425

Source: Central Bureau of Statistics, Stockholm, Sweden.

A steep decline has occurred in the birth rate in Sweden since the mid-1940s, when it was 18.6 per 1000, to the current figure of about 14.3 per 1000.

It is interesting to note that the distribution of the gainfully employed population by industry is following a pattern similar to that experienced in the United States. This is shown in Table A-4.

TABLE A-4. DISTRIBUTION BY INDUSTRY OF GAINFULLY EMPLOYED POPULATION IN SWEDEN, 1950 AND 1960

Industry	1950	1960
Agriculture, forestry, etc.	20.3	13.7
Manufacturing, mining, etc.	31.7	35.0
Construction, etc.	7.9	8.8
Electricity, gas, etc.	1.0	1.2
Commerce	13.4	13.4
Transport and communications	8.1	7.5
Public and private services, etc.	17.0	20.1
Unspecified	0.8	0.4
Total	100.0	100.0
Number of persons, millions	3.10	3.25

Source: Swedish Information Centre, Ostgotagatan 45, Stockholm SO.

Expenditures on clothing and footwear in 1963 amounted to 5,384,000 Kr, or 11.5 percent of the total consumer expenditures. In 1958, the corresponding percentage figure was 10.9 percent. Retail consumption per capita is expected to rise annually by 2.2 percent. However, consumption of clothing and footwear, kitchen and household utensils, and flowers is expected to increase more than average, or from 3 to 5 percent annually.

Sweden's consumption of all varieties of footwear increased from 23,100,000 pairs in 1962 to 26,500,000 pairs in 1964, a gain of about 10.4 percent. Of the total consumption, leather footwear amounted to 63.6 percent in 1962 and 58.8 percent in 1964. Plastic footwear amounted to 5.5 percent in 1962 and 2.5 percent in 1964.

Table A-5 shows the apparent consumption of nonrubber footwear for the years 1960 to 1964.

TABLE A-5. APPARENT CONSUMPTION OF NONRUBBER FOOTWEAR, IN SWEDEN, 1960-1964

In Paris

Year	Production	Imports	Exports	Apparent Consumption
1964	10,793,000	11,291,011	704,308	21,379,703
1963	10,771,000	8,804,779	358,272	19,217,507
1962	10,800,000	7,037,250	656,827	17,180,483
1961	10,755,000	6,794,177	427,979	17,121,198
1960	11,204,000	6,095,755	296,933	17,002,822

Source: U. S. Department of Commerce, Raw Data Survey, 1965.

Shoe-Business Conditions

In discussions with shoe retailers, large and small, independent and cooperative, and with shoe wholesalers and importers, it was found that the shoe-order time occurs essentially twice a year – much the same as in the United States. However, reorder time for shoes was found necessary and there appears to be a sliding back of the "final" reorder date, which puts more pressure on the manufacturing function. For example, it was noted that large German, French, and Italian firms could not compete as well as some smaller selected manufacturers, who could deliver within 3 weeks on reorder. However, it also was noted that there was a constant quality problem in dealing with certain manufacturers.

One retailer gave an example of a French women's shoe order totaling 2,600 pairs and divided into 13 sizes, with widths ranging from A through EE. This retailer is an excellent merchandiser and does approximately 2 percent of all the shoe business in Sweden. He promotes and sells a complete line of men's and women's shoes, including a type of British casual shoe retailing at $20.00. Last year he sold 5,000 pairs of these shoes. He spends $80,000 on advertising per year. In his opinion, "American manufacturers are not interested in world markets".

Another firm gave a typical order of 130 pairs of one model of women's shoes in E width. These sizes followed a normal distribution curve ranging as follows: 2, 3, 5, 10, 15, 20, 20, 20, 15, 10, 5, 3, and 2 pairs in each size. A similar order pattern for men's shoes in D width would total 95 pairs. Thus, sales and general conditions are similar to those in the United States.

Terms of payment in the trade, however, are not "cash in advance as America used to be accustomed to". In Sweden, payment 30 days after receipt of the goods is customary. This means that a manufacturer ships and invoices his merchandise, the goods are enroute for approximately 30 days, and then payment will follow in 30 more days. In United States terms, this would mean approximately 5 percent cash for 60 days, net 90 days. It also was stated that several foreign firms extend considerably more favorable credit terms, but that this was not necessary.

No import licenses are required or restrictions made on imports. The only tax is the retail sales tax of 10 percent, which is included in the price of shoes. Countries not belonging to the EFTA have a duty assessed of 14 percent ad valorem CIF.

In summary, shoe-business conditions in Sweden are very much like those in the United States. There are well-developed information sources according to different industries and advanced consumer-product testing facilities and services appear to be available.

Competition

The output of leather shoes rose by 1 percent to 10,400,000 pairs during 1964, while output of other types rose by about 12 percent to 7,000,000 pairs. Imports of leather shoes increased by 17 percent to 6,300,000 pairs. Since 1960, imports have risen by about two-thirds. Consumption of leather shoes has increased about 3 percent to 15,600,000 pairs. About 40 percent of this total consumption is supplied by imported shoes, compared to 30 percent 4 years ago.*

A characteristic of the Swedish shoe market is that foreign shoes constitute a considerable share of the total number of shoes sold. In fact, the market share held by imported shoes (which has grown strongly during recent years) is greater than in any other country in Europe. The increase in shoe imports has been roughly the same, numberwise, as the increase in shoe consumption.

The growing pressure from imports, together with fierce competition among Swedish producers, has meant that the Swedish shoe industry has been forced to operate under difficult financial circumstances over a period of years. A large number of firms, principally small-scale enterprises, have been put out of business, while a majority of those that have survived have had to be content with low profitability. This is evident in the fact that in 1954, 253 firms, and in 1960, 202 firms, were listed as shoe manufacturers.** A current list of Swedish manufacturers of shoes shows only 98 names.

The pressure from imports has been particularly marked with respect to women's shoes, while the Swedish production of men's and children's shoes has been more able to hold its own. This is partly due to the fact that women's shoes are at the mercy of change in fashion. Women's shoes from Italy have been the chief competitors, although it was learned that French women's styles also seem to be gaining increased favor. Children's shoes, on the other hand, have met with stiff price competition, chiefly from the Benelux countries. The majority of shoes imported into Sweden originate in EEC countries, as shown in Table A-6. This table also shows the flow of shoes out of Sweden, most of which move into nearby Scandinavian markets.

The average price of imported shoes is shown by year, country, and type of shoe in Table A-7.

Foreign competition derives not only from price differences but also from style and fashion leadership. Labor cost per hour in Italian and Dutch shoe industries is roughly

* Sweden's Economy 1964. An Economic Survey, Svenska Handelsbanken, Stockholm, Sweden.
** Sweden's Economy in 1964. Skandinavisk Banken Stockholm, Stockholm, Sweden.

TABLE A-6. SWEDEN - IMPORTS AND EXPORTS OF SHOES, BY COUNTRY, 1962-1964

Import Sources

Types	Country	Pairs	Value[a]
1964			
Men's	(1) Italy	602,249	11,342
	(2) Yugoslavia	140,134	1,937
	(3) Czechoslovakia	95,093	1,184
Women's	(1) Italy	2,255,851	41,744
	(2) W. Germany	426,973	10,622
	(3) Denmark	236,364	5,720
Children's	(1) Italy	90,656	927
	(2) Netherlands	33,837	423
	(3) Denmark	25,139	379
Total imports		11,291,011	145,748
1963			
Men's	(1) Italy	602,879	11,372
	(2) Czechoslovakia	211,114	2,577
	(3) Yugoslavia	88,624	1,432
Women's	(1) Italy	2,207,155	42,637
	(2) W. Germany	360,340	8,873
	(3) France	160,479	2,654
Children's	(1) Italy	134,925	1,455
	(2) Netherlands	51,953	533
	(3) Belgium	17,192	209
Total imports		8,804,779	122,067
1962			
Men's	(1) Italy	586,060	10,615
	(2) Czechoslovakia	88,160	1,302
	(3) Yugoslavia	59,293	987
Women's	(1) Italy	2,324,558	42,546
	(2) W. Germany	270,388	6,623
	(3) France	125,296	2,092
Children's	(1) Italy	164,833	1,833
	(2) Netherlands	71,100	721
	(3) France	21,034	178
Total imports		7,037,250	99,513

SWEDEN

Export Destination

Types	Country	Pairs	Value[a]
1964			
Men's	(1) Norway	26,411	871
	(2) Denmark	16,563	625
	(3) USSR	12,723	411
Women's	(1) Denmark	40,528	856
	(2) Norway	21,720	399
	(3) Finland	10,210	325
Children's	(1) Norway	10,355	204
	(2) Other	10,942	216
Total exports		704,308	8,138
1963			
Men's	(1) Norway	19,564	769
	(2) Denmark	16,156	553
	(3) USSR	10,264	362
Women's	(1) Denmark	42,771	866
	(2) Norway	7,149	129
	(3) Finland	5,190	172
Children's	(1) NA		
	(2) NA		
	(3) NA		
Total exports		358,272	6,781
1962			
Men's	(1) NA		
	(2) NA		
	(3) NA		
Women's	(1) Denmark	39,543	805
	(2) Norway	12,493	347
	(3) E. Germany	7,638	266
Children's	(1) NA		
	(2) NA		
	(3) NA		
Total exports		656,827	10,837

Source: Raw data - U.S. Dept. of Commerce.
(a) In 1000 Kroner (= $193.30 U.S.).

TABLE A-7. AVERAGE PRICES CIF, LEATHER SHOES IMPORTED INTO SWEDEN, BY COUNTRY AND BY TYPE, 1962-1964

(Kroner: Ore/Pair[a])

Source	Type	Year 1962	1963	1964
All imports	Women's	19:46	20:82	20:80
	Men's	18:30	18:96	19:69
	Other	9:53	9:63	9:64
	Total	18:20	19:44	19:56
Italy	Women's	18:13	19:27	18:20
	Men's	17:99	18:36	18:71
	Other	10:78	10:36	9:35
	Total	17:66	18:61	17:89
Germany	Women's	24:57	24:61	25:18
	Men's	32:90	32:65	27:07
	Other	9:22	8:75	8:59
	Total	23:94	24:78	24:12
Denmark	Women's	--	35:96	23:16
	Men's	--	29:61	22:32
	Other	--	11:68	13:65
	Total	--	31:07	22:--
France	Women's	16:72	17:36	16:75
	Men's	13:01	14:89	17:55
	Other	6:95	7:08	7:20
	Total	14:04	15:43	15:16
Benelux	Women's	18:99	17:17	17:24
	Men's	17:22	18:45	19:75
	Other	8:69	9:21	8:35
	Total	13:--	13:51	14:28
Czechoslovakia	Women's	10:17	12:18	10:98
	Men's	12:69	11:93	10:69
	Other	--	--	--
	Total	12:49	11:94	10:67
Holland	Women's	27:45	25:04	26:46
	Men's	72:11	61:92	58:83
	Other	18:22	14:52	17:16
	Total	--	--	--
Yugoslavia	Women's	15:09	14:68	16:16
	Men's	16:41	16:85	14:23
	Other	--	11: 27	13: 56
	Total	16:02	15:65	14:54
Great Britain	Women's	32:40	30:08	32:01
	Men's	43:77	33:52	31:38
	Other	9:59	9:38	15:50
	Total	30:--	29:36	31:35
Switzerland	Women's	39:40	33:25	35:19
	Men's	56:55	55:36	52:80
	Other	23:83	20:73	17:59
	Total	42:39	36:67	37:29

Source: Skohandlaren - Organ for Sveriges Skohandlar Forbund - Stockholm, Sweden.

(a) 5 Kr: 19 ore = $1.00 U.S.

one-half that prevailing in Sweden. Sweden's labor cost is the highest in Europe.* As indicated in Table 21, there has been a decline in price of most types of the more expensive British and Swiss-made shoes. This could well have resulted from the necessity of keeping their market in the face of increasing volume pressures from a few large-store buyers. Prices of Italian and French shoes have stayed at approximately the same price to slightly higher, probably reflecting their increase in wage rates.

During the time of the visit by Battelle researchers, it was also announced that the two largest shoe manufacturers in Sweden had completely closed their production facilities and had moved these facilities to Italy and Spain, respectively. These two manufacturers plan to import to themselves and distribute in Sweden.

Distribution Channels

Consumer-product distribution channels in Sweden are very well defined. There is an association of commercial agents, some of whom represent footwear manufacturers both in Sweden and in foreign countries. Over 180 United States subsidiaries are doing business in Sweden, and there are over 6,000 Swedish representatives of United States firms. According to 1964 figures, 2,489 stores are selling footwear; this is approximately 3.3 per 10,000 inhabitants. There are relatively few warehouses, and the number seems to be declining. For example, it is estimated that by 1970 there will be approximately 25 private wholesale warehouses, 25 purchasing organization warehouses, and 15 consumer cooperative warehouses. This is a decline from the 1963 figures of 60, 53, and 34, respectively.** Approximately 90 percent of the warehouses are situated in the three largest cities in Sweden – Stockholm, Gothenburg and Malmö.

The trend in food retail stores has followed a pattern similar to that in the United States. Self-service stores make up 30 percent of the total number of grocery stores and account for 60 percent of the total grocery turnover. Some 242 chain department stores were operating at the end of 1963, 35 more were under construction, and 59 more were planned. An additional 20 to 30 department stores are owned by independent retailers or companies.

Buying groups from Germany are represented in Sweden, as well as agents representing Italian and French shoe manufacturers. There are retail stores owned or jointly operated by Italian firms and Swiss firms. Names and addresses of these are available from lists through association and library sources.

As mentioned earlier, there are many sources of data that go into considerable detail as to services, costs, value added, etc., by the different types of distribution channels. These data are further broken down into types of shoes and types of shoe outlets. Much of this information is too voluminous and too detailed to include in a report of this type. However, it would be useful to individual companies or organizations planning to market shoes in Sweden.

For example, there has been a trend in the past for shoe manufacturers to integrate into the retailing function, but this is reported to have since been reversed because of

* The Quarterly Review, 44, (2) (1963) Skandinaviska Banken, Stockholm 16, Sweden.

** Information Center Sweden, Ostgotagatan 45, Stockholm, Sweden.

competition at the retail level. There are cooperative retailers, independent retailers, independent chain stores, and single retail stores. Some of these are more efficient than others in their distribution methods, but it is interesting to note that the total average margin for all types of shoe retail operations is approximately 51 percent. Margins for men's shoes average 48.2 percent, women's shoes 54.9 percent, and other shoes 45.7 percent.

These figures also are available by market areas, and show that Stockholm has the highest margin for operation. It averages (for all shoes and all types of stores) 57 percent, exclusive of sales tax. Other cities show a lower margin, with Gothenburg and Malmö combined averaging 54.2 percent. (This margin is based on cost divided by retail price.) It is interesting to note that in terms of store size, the larger stores also have the higher operating margin. Stores with shoe-sales volume over 1000 Kr average 56.4 percent margin, exclusive of taxes. Stores with shoe-sales volume less than 1000 Kr average 50.4 percent margin.

Profits and costs as a percentage of sales in private retail enterprises have been reported for foods, men's wear, ladies' wear, furniture, paints, footwear, and other products. In 1963, gross profits for footwear shops were 28.9 percent. The cost breakdown by percentages was as follows: wages and salaries, 11.4; rent, 2.3; office expenses, 1.2; advertising, 1.7; transportation, 0.5; maintenance, 0.8; depreciation, 0.7; interest, 0.7; and other costs, 0.4; making a total cost factor of 20.6 percent. Net profit was 8.3 percent. These figures relate to retail enterprises with 500,000 to 1,000,000 Kr annual turnover.*

Retail Merchandising

The trends in retail merchandising occurring in Sweden appear to be very comparable to those currently taking place in the United States. Traveling through different cities, one can see where the old central parts of towns are being completely renovated. The building of huge, modern shopping centers in suburbs indicates that a great deal of planning, research and organization is being put into the establishment of the new types of retail establishments. Associations such as the Federation of Swedish Wholesale Merchants and Importers, The Swedish Cooperative Union and Wholesale Society, and the Swedish Retail Institute, as well as the Swedish Shoe Retailers Association, provide a wide variety of services to their members. For example, the Shoe Retailers Association provides sales-training services, merchandising-training services, and other business assistance to help their members. Since there is no commercial radio or television advertising, most of the advertising is done by point-of-purchase displays and newspaper media.

Most stores stay open 45 hours per week. Downtown stores stay open on Monday nights, and shopping-center stores are open on Wednesday, Thursday, and Friday evenings. The retail merchandising practice and display methods used are very comparable to those found in the United States. The shoe departments in some of the large department stores are leased, which is the practice in the United States. Individual shoe stores, both in the city and in the suburbs, are predominantly staffed with female sales

* Swedish Retail Institute, April 1965, Stockholm, Sweden.

personnel. The advertising expenditure by most retailers is 1 to 2 percent of sales in stores having at least 500,000 Kr sales volume. It is customary for manufacturers to support this, and manufacturers state that they spend up to 6.7 percent of their cost for promotional efforts.

The Swedish Shoe Retailers Association has 900 members with approximately 1,100 to 1,200 shops. Approximately one-third of these shops are rather passive in their merchandising efforts and they are primarily "Mom and Pop" stores. They will survive as long as both are living. Another third are very strong, aggressive members. Some are expanding. There is only one large retail chain. It is a totally integrated operation and has some 200 shops with 16 to 17 percent of the total market. The cooperatives (with their shoe departments, either leased or owned) account for 8 to 9 percent of the total footwear business in Sweden. The one retailer referred to earlier has only two shops, but does over 15,000,000 Kr volume and accounts for approximately 2 percent of the total business in Sweden. There is one exclusive footwear store in Gothenburg that reportedly does over 10,000,000 Kr of business in the one store.

The largest independent chain of shoe stores is reported to have around 40 shops. Another organization has 20 shops and another 10. Another company, which appears to be expanding, was formerly in the manufacturing function only and has since discontinued that activity. It is now a retailer only, and it has expanded to some 40 shops.

In summary, two-thirds of the retailing shoe establishments in Sweden are independent. There are one or two large chains, the balance being made up of individual owners of 1 to 12 shops.

The typical cost for retail-store space averages between $10 to $15 per square foot per year. However, the association has a rule of thumb that a retailer can pay up to 6 percent for rent.

The retail association reported that the average-size order by a retailer with a 500,000 Kr sales volume per year would be approximately 20 pairs of shoes of the same model. Therefore, a normal order would approximate 50 pairs if he was ordering more than one width.

It is reported that most retailers will buy 4 to 6 months in advance, with March through June being the time when 70 to 80 percent of the fall shoes are purchased. From September through December 10, spring shoes are purchased. Deliveries usually start during August and February, respectively.

Sweden has two shoe fairs a year. One is during early March and is usually held at Stockholm, Gothenburg, or Malmö. The late-September fair is held every year at Malmö. Approximately 450 retailers attend the latter fair with their wives, as well as approximately 1,000 industry manufacturer's agents, representatives, etc., making a total attendance of about 2,000 people. This fair is similar to the Chicago Shoe Fair, where buyers set up appointments and show their products in individual exhibits.

ANALYSIS OF THE FRENCH MARKET

Introduction

The French Government is dedicated to a policy of planned economic development. Within the framework of its economic planning system, the government provides leadership and guidance for the private sector in developing economic goals for the nation.

The following table shows recent French population history and projections, by age groups, for 1963 to 1985. Note the structure of the population is not expected to change very much. This is significant in the marketing of consumer products, such as shoes.

TABLE A-8. POPULATION GROWTH PROJECTIONS AND COMPOSITION BY AGE GROUPS IN FRANCE, 1963-1985

Year	Population	Percentage by Age Group		
		Under 20	20 to 64	65 or older
1963	47,573,000	33.4	54.8	11.8
1965	48,207,000	33.8	54.0	12.2
1970	49,837,000	32.9	53.9	13.2
1975	51,723,000	32.3	53.9	13.8
1980	53,815,000	32.2	53.6	14.2
1985	56,010,000	32.3	55.1	12.6

Source: Institut National de la Statistique et des Etudes Economiques, Bulletin Hebdomadaire de Statistique, No. 788, July 27, 1963, and No. 782, June 15, 1963, Paris, France.

French industrialists have had their margins squeezed between fixed prices and rising wages, with the result that self-financing by firms has declined. There are still sources of inflationary pressures due to the shortage of labor, and the government has had to steer a careful course between the risk of allowing inflation to be resumed on the one hand and forcing the economy into a recession on the other. The fifth government plan (for the years 1966-70) will face the main issue of whether France should seek an annual rate of expansion greater than 5 percent of whether this rate is accepted as being the highest that is feasible.*

Hourly wages for shoe-industry workers in various countries are shown in Table A-9.

Production and consumption of French shoes is shown in Table A-10. Note that domestic consumption is fully satisfied by production, since France exports more than it imports.

* "Trading with France", Board of Trade Journal Supplement, 9 April 1965 (London, England).

TABLE A-9. AVERAGE TOTAL HOURLY WAGE OF SHOE-INDUSTRY WORKERS IN SELECTED COUNTRIES, 1963

Country	Hourly Wage, U. S. $
Germany	$1.10
France	.88
Italy	.90
Netherlands	.72
United Kingdom	.98
Sweden	1.30
Japan	.60

Source: Organization for Economic Cooperation and Development, Paris, France, 1965.

TABLE A-10. SHOE AND SLIPPER PRODUCTION AND APPARENT CONSUMPTION IN FRANCE (OTHER THAN RUBBER AND PLASTIC), 1960-1964

Quantities in Pairs

Year	Production	Imports	Exports	Apparent Consumption
		Shoes		
1960	79,604,000	2,600,000	19,500,000	62,704,000
1961	86,606,000	2,800,000	20,700,000	68,706,000
1962	93,600,000	4,100,000	20,900,000	76,800,000
1963	109,405,000	6,500,000	20,800,000	95,105,000
1964	112,360,000	8,000,000	24,700,000	95,660,000
		Slippers		
1960	65,100,000	222,560	2,679,020	62,643,540
1961	67,300,000	227,970	2,238,560	65,289,410
1962	59,850,000	421,430	2,779,070	57,492,360
1963	69,100,000	1,014,180	3,485,500	66,628,680
1964	70,112,000	1,713,710	3,660,260	68,165,450

Source: Federation Nationale de la Chaussure, Paris, France, 1965.

Business Conditions

Shoe order time in France is similar to that faced by United States manufacturers; basically, orders are placed twice a year. However, reorders in France seem to be highly critical. There is an 11 percent tax on inventories; thus, the retailer does not order heavily and the manufacturer does not produce far in advance of orders. A 21-pair order in France is considered good size. One manufacturer stated that his average parts-inventory time was less than 1 day.

Delivery of the merchandise can present problems, but since most sales are made direct, transportation is usually the chief problem encountered once the product is completed.

Terms of payment are comparable to those used in the United States, but not to those used by American exporters. French trade sources state that a 3 percent cash discount for 60 days, net 90 days payment, is absolutely essential.

The import duty is 20 percent on all extra-EEC sources. Freight is generally calculated at 10 percent. Thus, a French shoe costing $1.05 is comparable to the same shoe shipped from the United States and landed in France at a cost of $1.32. To either of these two costs, the French have a value-added tax factor that adds an additional 25 percent. (However, French manufacturers who export receive a 100 percent rebate on the value-added tax.)

Large buyers prefer to deal directly with United States firms, thereby eliminating the 25 to 30 percent commission earned by wholesalers and importers.

Competition

There are approximately 800 shoe manufacturers in France. The industry is fragmented, with a few large producers, but with the majority of the production being spread among many small producers. (The largest company does only 2.5 percent of the industry volume.) A typical manufacturer visited by Battelle had a total daily production of 350 pairs produced by 70 employees, each having an average production of 5 pairs per day. (In the United States the average is 12 pairs.) These shoes are produced in approximately 240 styles, 7 sizes, and, in general, 1 width. The order time for leather was 1 month, and the average parts-inventory time was less than 1 week.

Several references were made to the superiority of the quality of the French-manufactured shoes. Discounting the subjectivity of these comments, it still was broadly accepted that the quality of the United States shoes does not command a premium price in the French market place. Conversely, Italian shoes earn a 20-franc premium based entirely upon the style.

The degree of handwork is generally recognized as a symbol of quality and is translated into premium consumer value.

An interesting comment by one retailer was that there is so much variation in sizes produced by manufacturers that it is a waste of time to measure a woman's foot exactly. The consensus was that the French foot is wide and borders on the outside

extreme of typical American size-width relationships. The real importance of fit is reflected by the one or two widths in the French market, compared with the several width options in the middle or narrow range available in the United States market.

Currently, several prominent American manufacturers are active through joint ventures in France. Another large integrated company also is rumored to be actively seeking joint participation with a leading French high-fashion integrated company. Thus, even though there is a great deal of local competition and major third-country competition, American companies still feel that they can make a profitable contribution to this market. It is reported that one American manufacturer who has invested a considerable sum in the promotion of his product has not experienced the same success in the French market as in other foreign markets. According to industry sources this is in part due to the fact that the French male consumer likes a soft-leather dress shoe. Thus, an Italian hand-finished model with soft shining leather upper, fully leather lined, and with rubber or leather sole was reported to have a higher value orientation when selling at the same price as the American rough-leather upper and sponge-rubber sole.

Table A-11 shows the French shoe export and import history for the years 1962 to 1964, by country. Note the high ranking of the United States as a market for French shoes.

Distribution Channels

The distribution system can be divided into three broad categories of firms: wholesalers, buying organizations, and retailers. The wholesale function has been directly affected by the development of independent retail buying organizations. This practice has become so prevalent that it is estimated that only 5 percent of toal gross sales are now handled by wholesalers.

Industry sources indicate that in 1960 there were approximately 12,150 points of retail sale in the shoe industry, with 2,200,000,000 NF* in sales. The retail function is divided into 11,100 independent operators and 1,050 chain shoe stores. It was also reported that approximately 63 percent of the sales volume was done by independent retailers, 28 percent by chain stores, 4 percent by large department stores, and 5 percent by small cooperative stores.

A later study in 1962 reported that 37 companies were operating 871 retail chain stores and were doing a volume of business of about $111,000,000 (approximately 444,000,000 NF). These 37 companies, selling approximately 20,000,000 pairs of shoes, represent about 90 percent of total sales made by the chain shoe stores.

It is apparent that independent shoe retailers are the strongest type of retail outlet. Typically, this independent retailer is middle aged and has grown up in his profession. However, it was noted that today's children generally are not succeeding their parents in this profession. Neither can an interested young man readily afford the 100,000 NF (40,000 for stock and 60,000 for building) necessary to begin a moderate-size shoe store. New store locations are extremely scarce, and there is an unreported cost of obtaining the key to the store once a man has agreed on a rental cost that which is controlled by the government. This additional cost, referred to as the "key cost", can be

*New francs.

TABLE A-11. FRANCE- IMPORTS AND EXPORTS OF SHOES BY COUNTRY, 1962-1964

Import Sources					Export Destinations			
Types	Country	Pairs	Value		Types	Country	Pairs	Value
Men's	(1) Italy	593,900	145,860		Men's	(1) Algeria	1,040,260	151,860
	(2) Switzerland	40,660	20,460			(2) USA	879,440	85,270
	(3) Poland	30,370	2,450			(3) Gr. Britain	549,020	49,010
				FRANCE		(4) Belgium	434,990	62,690
				1964		(5) Ivory Coast	394,540	38,380
						(6) W. Germany	387,870	52,800
Women's	(1) Italy	277,150	30,730		Women's	(1) Algeria	633,130	44,580
	(2) W. Germany	24,810	4,110			(2) Belgium	176,450	18,470
	(3) Various	16,330	1,600			(3) W. Germany	146,640	17,780
Total Imports		12,928,870	1,217,640		Total Exports		35,155,910	3,125,160
Men's	(1) Italy	338,590	104,640		Men's	(1) Algeria	1,219,770	140,990
	(2) Morocco	36,810	5,280			(2) USA	662,460	70,590
	(3) Switzerland	34,320	17,500	FRANCE		(3) Gr. Britain	405,170	35,950
Women's	(1) Italy	128,740	13,220	1963	Women's	(1) Algeria	443,550	25,230
	(2) Belg-Lux	33,760	6,270			(2) W. Germany	115,530	11,470
	(3) W. Germany	18,920	2,290			(3) Belgium	90,230	9,880
Total Imports		10,269,010	793,160		Total Exports		38,608,870	2,535,300
Men's	(1) Italy	59,790	204,010		Men's	(1) Algeria	1,120,490	105,480
	(2) Switzerland	8,280	15,880			(2) USA	438,450	48,440
	(3) W. Germany	3,120	14,130	FRANCE		(3) W. Germany	384,660	28,700
Women's	(1) Italy	76,870	8,830	1962	Women's	(1) Algeria	327,070	19,480
	(2) Various	12,610	910			(2) USA	81,670	3,230
	(3) W. Germany	4,120	590			(3) W. Germany	79,170	7,110
Total Imports		6,390,560	697,520		Total Exports		33,028,680	2,263,720

Quantity: In pairs.
Value: In 1000 F. francs.
Source: Raw data - U.S. Dept. of Commerce.

NOTE: Data on youths', children's, boys', or girls' shoes were not available.

rather high depending on the location. However, the key cost is recoverable if the store is later leased to someone else.

Conversely, the tax structure in France has discriminated against the development of chain stores. Presently the "super patente" tax (3 percent) is levied only against chain-store total sales. However, industry sources indicate that there is pressure to set aside this tax by 1967 or 1968.

There have been several attempts by large food discounters to enter the department-store and shoe-retailing business, but to date these have not met with a great deal of success.

The chain stores do not offer advantages that the French Government is seeking in its economic development efforts. Volume sales reduce distribution costs and made possible a better quality product at a comparable or lower price to the consumer.

One example of the advantages that chain stores have is location. Many successful ones are located in the prime shopping areas of Paris. In addition, they have outlets in other cities with population of 30,000 or more. A partial list of shoe chain stores operating in France is as follows: André, 160 stores; Bata, 250 stores, Bally, 60 stores. SAG (anonyme society of management) has 110 stores and controls the Raoul, Dressoir, and Pinet lines. Heyroud has 25 branches and Manfield has many stores throughout Europe.

Only the large manufacturers have their own traveling agents receiving a guaranteed minimum plus a commission. Wholesale salesman receive a commission of approximately 4 percent, including traveling expenses. The chains either produce themselves and/or buy direct from manufacturers. The independent retailers are represented by buying groups mentioned earlier, four of which are: the Union of French Shoes, the Central Shoe Buyers Group (CEDAC), the Counter Shoe Buyers, and the Uniroc Group. There is also a German buying organization called Deutschland's Nordwest. It operates in other Europen countries as well.

Imported footwear usually is sold direct by the producers who exhibit at the French leather shows. Orders are placed directly by retailers, chain stores, and buying organizations. A small percentage of foreign manufacturers have sales agents located in France. There is a trade list (available from the American Embassy) entitled "Boots and Shoes Manufacturers – France", which contains lists of all importers.

Retail Merchandising

There appears to be considerable fear on the part of the independent shoe retailer of the development of large stores and of American marketing and merchandising methods. There are few shopping-center developments, and Parisian prices and merchandising practices are somewhat different from those found in other Frech cities.

The normal inventory turnover for a French shoe retailer is 2-1/2 to 3 times per year, and his operating margin from retail price ranges from 33 to 50 percent.

Brand names are becoming more important as a sales factor. Large chain stores sell under their own trademark. Some of these stores have their shoes manufactured in Italy, from French components. The finished product is sold in the chain store with a tag saying "Made in Italy". (This is similar to American trade practice.) Currently, however, the main attitude of the consumer is to look upon the retailer as the expert. Since shoes represent an important purchase, consumer loyalty still rests mostly with the store rather than the shoe name. Socioeconomic factors will tend to change this, but French individualism will hold this change to a slower rate.

Advertising is largely of the mass-media type in women's journals, daily papers, and weekly magazines. Large-scale point-of-purchase advertising is limited because of the size of the retail outlets, but a trend seems to be developing for its increased use.

The price structure of French shoes at the retail level can be broken into a number of segments. It is estimated that men's shoes selling in the 20 to 35-NF range constitute about 10 percent of the total sales volume. About 70 to 75 percent of the total sales volume takes place in the 35 to 50 NF range. The 50 to 100-NF price range covers approximately 10 percent of men's shoes sales, and the price range of 100 NF or more, about 5 percent of the volume. Thus, it can be seen that the great bulk of shoes are sold in the 35 to 50-Franc price range, which is comparable to the $7.00 to $10.00-price range in the United States.

The European turnover in inventory, both at the retail and at the manufacturer level, is about the same as it is in the United States. It is interesting to note that fewer widths do not necessarily mean less inventory. Inventory may be comparable because of the larger number of styles that the retailer carries. The one caution advanced by a number of interviewees was that it is very easy for a French or Italian manufacturer to quickly copy a product and then sell it for approximately 25 percent less than current premium American prices.

Marketing Requirements

Most of the wholesalers stated that American products had to be new or so cheap that they could compete favorably in price. However, this is a rather typical wholesaler reaction both in France and in the United States. Several sources did indicate the importance of the warehouse function in shoe supply in order to be able to compete with the short production cycle available through European production sources. It was generally indicated that if American products could be landed in France for approximately the same as the wholesale price in the United States, the product could compete.

The joint-venture method of marketing currently being pursued by several American companies appears to be the best way to penetrate the French market. It offers the advantage of local location, personnel, name, and political pressure, in combination with superior American methods of marketing, merchandising, and promoting. This type of capability requires time to develop, and it would appear that the timing of these American companies is quite good relative to changes and trends anticipated over the next 5 years.

REPORT OF BELGIAN VISITATION

Introduction

According to the statistical data analyzed, Belgium does not currently appear to be a very good market for American shoes. However, some shoes are being exported there. Because Belgium is the center of the European Economic Community and therefore possibly could serve as a distribution point if a marketing capability were to be developed in this region, it was decided to briefly investigate the industry in Belgium and to talk with economists and other key information sources in the European Economic Community organization.

Background

The shoe industry in Belgium can best be defined as "small, difficult, and different". Most of the producing companies are quite small, are generally family owned, and sell to many small, family-owned stores. New developments and new styles in the shoe industry are readily copied and appear on the market within 3 to 4 weeks.

Development of better transportation in Belgium is causing a shift in consumer-buying practices. Where they once were highly self-sufficient or at least purchased most of their supplies from a nearby village, Belgian consumers now come to the city. The market is changing, and because of the rising standard of living, money is readily available. Shoes still remain an important item of purchase, although prices paid for shoes do not seem to be as much of a limiting factor as in other countries. Thus, there appears to be a market for expensive shoes. There also is a growing market for the cheaper, shorter-life, speciality-use type of shoe.

Sources of data are well-defined and quite complete as far as the total shoe industry is concerned. Lists of manufacturers, agents, wholesalers, stores, etc., are readily available.

APPENDIX B

SOURCES OF INFORMATION

Interviews in Stockholm, Sweden

Bergman Salonger AB
Tulegatan B

Detaljhandelns Vtredningsinstitut
(Retail trade research)
Jakobsburg 23

Jerns Skosalonger
Drottninggatan 33

Handels Bata AB
Sveavagen 59

Internationat Economic Research
Kungsgatan 65

Konsumentoinstitut
Ralambsvagen 8

Lagersons Skosalonger A B
Kungstan 4

Nordiska Kompanient AB

Sergel Sko
Sergelgatan 12

Skoindustrins Forskerings institut
Fredsgatan 7
Orebro, Sweden

Skoman AB
Sergelgatan 16

Sveriges Grossistforgund
(Wholesalers' federation)
Regernigatan #5

Sveriges Skohandlarforbund
Mastersamuelag 22

Svexico AB
Klara Norra Kyrkog 26

Varudensklarationsnamuden
Sandelsgatan 16

Westinghouse Scandinavia AB
Birger Jarlsgat 15

William P. Hamilton
Polhemsgatan 21

Wolfco AB

United States Embassy and Trade Center
Vasagatan 11

Interviews in Paris, France

American Embassy

Institut Battelle

Comptoir de Petits Fabricantes

Federation Nationale de l'Industrie
de la Chaussure de France

Frank Reeves Import Company

Kent Shoe Company

Printemps (Department store)

Septoeur

Shoe Import Association

Société Elie Meyer and Company

Syndicat Nationale du Commerce
(Shoe Buying Group)

Tanagra, S.A.

Interviews in Brussels, Belgium

American Embassy
27 Blvd. du Regent

Bank Lambert
24 Ave. Marnix

Chaussures Mattijs
Rue de Corbean 99

European Economic Common Market
Headquarters
23 Ave. de la Joyeuse Entrée

Jules Norro & Cia.
14 Rue Savoie

M. A. De La Haye
Geo. Wehry & Cia.
32 A-Bd. Bandonin

N. V. Petra (Shoe)
Antwerse Stee Web
St. Amans Burge
Gent, Belgium

Walkover Shoe Cia.
128 Rue Neuve

United States Commission to European
Economic Community
80 Rue D'Arlon

United States Mission to European
Communities
54 Blvd. du Regent

Information Sources by Interview

American Girl Shoe Company
Boston, Massachusetts

American Shoemaking Publishing Company
Boston, Massachusetts

Bata International
Toronto, Canada

Bates Shoe Company
Webster, Massachusetts

Boot and Shoe Recorder
Boston, Massachusetts

Brown Shoe Company
St. Louis, Missouri

Commonwealth Shoe and Leather Company, Inc.
Whitman, Massachusetts

Corfam Division
E. I. du Pont de Nemours & Co.
Wilmington, Delaware

Dr. Posner Shoe Company
New York, New York

Edison Brothers Shoe, Inc.
St. Louis, Missouri

Endicott Johnson Corporation
Endicott, New York

F. & R. Lazarus and Company
Columbus, Ohio

Five Star Shoe Company
New York, New York

Florsheim Shoe Company
Chicago, Illinois

Genesco, Inc.
Nashville, Tennessee

G. H. Bass and Company
Wilton, Maine

International Shoe Company
St. Louis, Missouri

Information Sources by Interview
(Continued)

Italia Bootwear, Ltd.
New York, New York

J. F. McElwain Company
Nashua, New Hampshire

Julian and Kokenge
Columbus, Ohio

Julius Alschul, Inc.
Brooklyn, New York

Midstates Shoe Company
Milwaukee, Wisconsin

National Footwear Manufacturer Assoc.
New York, New York

Nunn Bush Shoe Company
Milwaukee, Wisconsin

Oomphies, Inc.
New York, New York

Plymouth Shoe Company
Boston, Massachusetts

Red Wing Shoe Company
Red Wing, Minnesota

Sandler of Boston
Needham Heights, Massachusetts

Sterling Last Company
Long Island, New York

Texas Boot Company
Lebanon, Tennessee

Trimfoot Manufacturing Co.
St. Louis, Missouri

United States Shoe Corporation
Cincinnati, Ohio

Union Carbide Company
New York, New York

Vulcan Corporation
Cincinnati, Ohio

Wall-Streeter Shoe Company
North Adams, Massachusetts

Weyenberg Shoe Manufacturing Co.
Milwaukee, Wisconsin

Wolverine Shoe and Tanning Corp.
Rockford, Michigan

APPENDIX C

INTERVIEW GUIDE
(Battelle Memorial Institute)

Company/Person (✓) Interviewed

Shoes Manufactured
____ Women's
____ Men's
____ Misses'
____ Youths'
____ Boys'
____ Children's
____ Infants'

1. Description of products you have, or plan to export?_____produce overseas?_____
(Style, size, wholesale price, etc.)

2. Where have you had, or do you expect, most success?_____Why_____

3. When did you, or do you plan, to market overseas?_____

4. How do you, or do you plan, to export?_____to produce?_____
(Export agency, license production, develop market)

5. Why have you acted, or plan to act, in this manner?_____

6. What problems have you encountered, or do you anticipate?_____
(Direct, e.g., tariffs and indirect deterents)

7. Volume Exported

$_____or_____pairs

B. Volume Produced Overseas

$_____or_____pairs

Interview date_____Battelle representative_____

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